Dual-Class Stock Splits and Liquidity

Joonghyuk Kim
Korea University
Phone: 82-2-3290-2607
Email: j-kim@korea.ac.kr

Ji-Chai Lin
Louisiana State University
Phone: 225-578-6252
Email: filin@lsu.edu

Ajai Singh
Case Western Reserve University
Telephone: 216/368-0802
Email: ajai.singh@case.edu

Wen Yu
Case Western Reserve University
Telephone: 216.368.6632
Email: wen.yu@case.edu

Preliminary
Comments Welcome

April 24, 2007

Dual-Class Stock Splits and Liquidity

Abstract

We examine liquidity effects of dual-class stock splits that change firms' ownership structure from one share one vote to two classes with disparate voting rights. Following dual-class splits, effective spreads, price impacts, and order execution difficulty increase and the investor base decreases significantly for both superior- and inferior-voting shares. In contrast, following a matched sample of regular splits, the investor base increases and order execution improves significantly. Pursuant to the adoption of extreme form of corporate governance and weakened shareholder rights, and consistent with the implied effects of a deteriorating information environment, we find that dual-class splits adversely affect stock liquidity.

Dual-Class Stock Splits and Liquidity

1. Introduction

Gompers, Ishii, and Metrick (2006) characterize the dual-class equity ownership structure of firms as an extreme form of corporate governance. The dual-class restructuring gives insiders private benefits of control while it provides them with a potent anti-takeover protection from the market's disciplining threat of a hostile takeover. In effect, choice of the dual-class structure facilitates managerial entrenchment, makes the monitoring mechanisms of capital markets less useful, and weakens shareholder rights.[1]

The restructuring of the original common stock into two classes with disparate voting rights typically entails the insiders' (managers and directors) retaining majority voting rights, often with only a minority claim on the cash flows of the firm. The link between firm value, corporate governance and shareholder rights is well established.[2] Several recent studies document that the agency problem, defined by Berle and Means (1932) and Jensen and Meckling (1976) between managers and stockholders of publicly traded firms, is exacerbated by the wedge between the insiders' voting rights and cash-flow rights created by the dual-class structure.[3]

Bebchuk, Cohen and Ferrell (2005) consider it important to understand *why* entrenching provisions lead to lower firm valuation. Two recent papers have addressed this question specifically for firms with dual-class structures in the U.S., where investor protection laws are strong. First, Gompers, Ishii and Metrick (2006) address the incentives versus entrenchment

---

[1] Jensen and Ruback (1983) and Shleifer and Vishny (1997) argue that the most common form of shareholders' wealth expropriation by management is that poor performing managers retain their jobs too long. Masulis, Wang and Xie (2006) show that managers protected from hostile takeover threats indulge in value destroying, 'empire building' mergers.

[2] Bebchuk and Cohen (2005) find that staggered boards, a governance structure that insulates corporate boards from removal, are 'associated with an economically meaningful reduction in firm value.'(p. 409). Gompers, Ishii, and Metrick (2003) show that firms with stronger shareholder rights significantly outperform stocks with weak shareholder rights.

[3] See Claessens, Djankov, Fan and Lang (2002), Lemmon and Lins (2003), Lins (2003), Masulis, Wang and Xie (2006) and Gompers, Ishii and Metrick (2006).

aspect of insider holdings.[4] The dual-class structures are ideally suited to address the issue and Gompers, Ishii and Metrick (2006) find that firm value is positively related to insiders' cash flow rights and has a negative relation to insiders' voting rights. Second, Masulis, Wang and Xie (2006) show that managers of dual-class firms engage in value destroying acquisitions and other sub-optimal corporate decisions which explains how the difference between voting and cash flow rights leads to lower firm value.

In a departure from prior studies, we provide a partial answer to the question by examining the liquidity effects of dual-class restructuring. We find that dual-class splits affect the stock's liquidity adversely. Given its linkage to asset pricing, the illiquidity evidence suggests that investors demand higher premium for holding shares of a firm following a dual-class stock split. Consequently, the firm faces a higher cost of capital (see Amihud and Mendelson (1996)), and thereby, a lower firm value. Our findings complement the recent studies of Brockman and Chung (2003), Eleswarapu and Venkataraman (2005), and Chung (2006), which show that the adverse information cost increases and stock liquidity decreases in countries with weak investor protection laws. Our evidence is consistent with their findings. Our contribution is that we link the adoption of dual-class structures, characterized as extreme corporate governance to stock illiquidity, and hence, lower firm value. Interestingly, while the U.S. has strong investor protection laws, a dual-class ownership structure can still undermine shareholder rights!

We employ a unique sample of 72 dual-class splits, where the dual-class ownership structure is created through stock splits and subsequently *both* classes of stocks trade concurrently in the capital markets. There is an important advantage in using this specific dual-class stock split sample. It allows us to examine the liquidity effects and the changes in the ownership structure for both classes of stocks (since both are concurrently traded in the capital markets

[4] Jensen and Meckling (1976) argue for the incentivizing effect of insider holdings whereas Fama and Jensen (1983) and Demsetz (1983) argue that too high a level of insider holdings leads to managerial entrenchment.

following the split), while holding the firms' capital structures and other characteristics largely constant.[5]

Regular stock splits are often viewed as returning the stock to a more favorable trading range intended to improve liquidity and to make the stock more attractive to investors (Baker and Gallagher (1980) and Baker and Powell (1993)). However, as we argue below, dual-class splits have the opposite effect on liquidity.

Market making costs on dual-class stocks could increase for the following reasons. First, DeAngelo and DeAngelo (1985) and Grossman and Hart (1988) argue that managers of dual-class firms have stronger incentives to indulge in extracting private benefits and wealth diversionary behavior, compared to those of single-class firms (with one share one vote rule). Under the conditions that monitoring mechanisms of capital markets are less useful and that shareholder rights are weaker, the incentives could cause managers to make their firms less transparent. Indeed, Tinaikar (2006) shows that, in the context of voluntary disclosures, dual-class firms tend to disclose less information. As the information environment deteriorates, the degree of information asymmetry between informed investors and market makers would increase.[6] Thus, market makers could face higher adverse selection costs in both superior- and inferior-voting shares after a dual-class split.

Furthermore, shares with superior-voting rights tend to sell at higher prices, reflecting largely private benefits of control (Lease, McConnell and Mikkelson (1983) and Zingales (1995)). Outside investors, who are interested in the firm but unlikely to participate in the control, are less likely to buy and hold shares with superior-voting rights. This suggests that insiders are likely to

[5] To address the impacts of changes in the ownership structure on stock liquidity, we follow Lipson (2003) and other studies that link a strand of research in the corporate finance literature with another line of research in the market microstructure literature. For example, Christie and Huang (1994) examine the liquidity effect of exchange listings; Butler, Grullon and Weston (2005) analyze the relation between stock liquidity and the cost of issuing equity; and Frieder and Martell (2006) and Lipson and Mortal (2004) study the interaction of capital structure decisions and stock liquidity.

[6] Informed investors include insiders, institutional investors, and others who may have access to private information or who can better process public information.

hold more superior-voting shares. Consequently, dealers who make markets in these shares face a higher probability of trading with insiders. To mitigate possible losses to insiders in a higher information asymmetry environment, dealers would widen bid-ask spreads and lower market depths for superior-voting shares.[7]

Dealers could also widen spreads and lower depths for inferior-voting shares because informed investors may prefer to use their private information in trading inferior-voting shares for which the costs are less and the other parties to their trades are more likely to be less informed outside investors. This implies that dealers in inferior-voting shares could face a relatively higher likelihood of trading with better informed investors after the dual-class split. To mitigate losses to better informed investors in a higher information asymmetry environment, dealers would increase spreads and decrease depths for inferior-voting shares as well.

Taken together, these arguments suggest that stocks would become less liquid after the dual-class split—and the decrease in liquidity should hold for both superior- and inferior-voting shares. The decrease in liquidity means that general investors face higher trading costs, and that order execution becomes more difficult.

Consistent with our prediction, we find that the effective spreads of both superior- and inferior-voting stocks are significantly higher than the spreads estimated before the stock split. We also find that both superior- and inferior-voting stocks have significantly higher Amihud's illiquidity measure (Amihud (2002)).

Recently, Liu (2006) proposes a multidimensional liquidity measure, the standardized turnover-adjusted number of zero daily trading volumes. Using the new measure, Liu (2006) shows that the illiquidity premium can subsume the size, book-to-market, cash-flow-to-price, earnings-to-price, dividend yield, and long-run contrarian investment effects. Since Liu's liquidity measure is multidimensional and significantly related to asset pricing, we also use it in

[7] Lee, Mucklow and Ready (1993) show that market makers are sensitive to changes in information asymmetry and use both spreads and depths to manage the adverse selection problem.

our analysis. As with Roll's (1984) effective spread and Amihud's illiquidity measure, we find that Liu's (2006) liquidity measure is also significantly higher after the adoption of a dual-class ownership structure indicating greater illiquidity. As stated earlier, the evidence implies that investors demand a higher illiquidity premium and that firms face higher costs of capital after a dual-class restructuring (see Amihud and Mendelson (1996)).

Overall, our findings suggest that creating a dual-class structure tends to significantly reduce stock liquidity. While insiders may obtain pecuniary and non-pecuniary private benefits of control in creating a dual-class ownership structure, the costs associated with the creation should not be ignored. The costs include the possibility that investors may be willing to pay less for either superior- or inferior-voting stocks because they expect expropriation and, as our findings suggest, higher trading costs and lower stock liquidity.

The rest of our study is organized as follows. Section 2 reviews the literature pertaining to stock splits and dual-class ownership structure and presents our hypotheses. Section 3 discusses data collection and presents summary statistics of sample characteristics. Section 4 has the empirical results and their implications. Section 5 contains the cross-sectional analyses to further address the extent to which the changes in insider ownership, and in investor base, affect stock liquidity. Section 6 carries our concluding remarks.

2. Literature Review and Hypotheses

2.1. Stock Split and Liquidity

Unlike regular stock splits that maintain the single-class status with one share one vote, the dual-class splits create two classes of stocks with incongruous voting rights. As stated before, a unique feature of our sample is that the dual-class ownership structure is created through stock splits and that subsequent to the split both classes of stocks trade concurrently in the capital markets. Of course, like any regular stock split, a dual-class split also results in an increase in the

number of combined shares outstanding, and a proportional decrease in the price level for both classes of common stock. As the Baker and Gallagher (1980) and Baker and Powell (1993) surveys reveal, managers often view stock splits as returning the stock to a more favorable trading range, intended to improve liquidity and to make the stock more attractive to investors. Therefore, to analyze the impact on stock liquidity of changing the ownership structure from single class to dual class common stock, we need to consider and control for the effect of stock splits on liquidity.

The issue of whether stock splits affect liquidity has been extensively examined and the empirical results are largely mixed.[8] With respect to trading volume, Copeland (1979) shows that stock splits decrease liquidity, but Maloney and Mulherin (1992) find the opposite effect. On balance, Lakonishok and Lev (1987) show that, taking into account the abnormally high trading volume prior to stock splits, the events generally have no permanent effect on trading volume.

On the dimension of the bid-ask spread, Conroy, Harris, and Benet (1990) demonstrate that the percentage spread tends to increase after stock splits, and that the increase is largely due to the fact that stock splits lower the price levels. Controlling for changes in the price levels, they show that stock splits have a positive, but statistically insignificant, effect on the spread.

Regarding investor base, Lamoureux and Poon (1987) and Maloney and Mulherin (1992) find evidence consistent with the practitioners' view that stock splits broaden a firm's shareholder base. Further, Schultz (2000) documents a large number of small buy orders following stock splits. Small traders buy after stock splits not because trading costs have fallen. On the contrary, Schultz finds that while market making costs decrease slightly, trading costs increase after splits. Putting the evidence together, Schultz (2000) argues that stock splits act as an incentive to brokers to promote stocks. Kadapakkam, Krishnamurthy, and Tse (2007) support the broker promotion hypothesis. Similarly, examining the trades of individual and professional investors, Dhar, Goetzmann, Shepherd and Zhu (2004) show that a higher fraction of post-split trades are

[8] Dhar, Goetzmann, Shepherd and Zhu (2004) provide an excellent literature review of the issue.

made by less sophisticated investors, evidence of a shift in investor clientele, which supports a commonly held belief that stock splits help attract new individual investors. Nevertheless, Easley, O'Hara and Saar (2001) find that stock splits attract uninformed trading, but informed trading increases as well, "resulting in no appreciable change in the information content of trades."

In sum, while there is clear evidence of a shift in investor base following regular stock splits, there does not appear to be any conclusive evidence that splits improve liquidity. As we argue below, dual-class splits have a much clearer implication for an adverse effect on stock liquidity.

2.2. Pros and Cons of Dual-Class Splits

The main difference between dual-class splits and regular stock splits is that the former create two classes of stocks with dissimilar voting rights. Taking a two-for-one split as an example, when a dual-class split becomes effective, shareholders receive one share with superior- and one share with inferior-voting rights for each original share held. The split could result in two clienteles—one interested in control and the other in cash flow rights—and conflicts of interest are likely, regarding the private benefits of control. As we list below, the conflicts could adversely affect market making costs, which would be reflected in the stocks' liquidity.

The conflicts of interest concerning private benefits of control could occur in any firm with any type of ownership structure. However, as Gompers, Ishii, and Metrick (2006) point out, firms that adopt a dual-class ownership structure tend to be the ones with greater private benefits of control. Consequently, the conflicts of interest regarding private benefits of control should be more intense in dual-class firms than in the general single-class firms.

A dual-class split allows insiders, including managers and large shareholders, to control the firm by holding just a sufficient number of superior-voting rights shares. If insiders already have a majority control of the firm before the split, they can decrease their holdings of inferior-

voting shares after the split, with no concern regarding loss of control. Alternatively, to finance projects, managers can raise additional equity capital by issuing more inferior-voting shares without loss of control by insiders. This mechanism has certain benefits—it allows managerial continuity with relatively low capital from insiders. The continuity gives managers more incentives to invest in firm-specific human capital and, with better/expert knowledge of the firm they can focus more on the firm's long-run performance (DeAngelo and DeAngelo (1985)). The continuity may also resolve the firm's underinvestment problem and, with additional equity capital raised from the issuance of inferior- voting shares, managers could finance the firm's growth without losing control (Partch (1987)).

Consistent with this argument, Lehn, Netter and Poulsen (1990) and Dimitrov and Jain (2005) demonstrate that firms with better growth opportunities are more likely to adopt a dual-class structure. Such firms subsequently engage in SEOs of inferior-voting shares to finance their projects, and have positive long-term performance.

On the other hand, a dual-class split allows insiders to shelter themselves from effective monitoring due to the diminished voting power of external investors. The dual-class split also removes potential threats of takeover, and thus weakens the capital markets' effective monitoring of managers, who are entrenched and have incentives to divert corporate resources. Jarrell and Poulsen (1988) provide evidence that the markets respond negatively to the adoption of a dual-class structure and document significant negative abnormal returns around the announcement day.

Moreover, Lins (2003) finds that firm value is lower when control and cash flow rights of a firm's management group are separated; and that the separation has a significantly more negative relation to value in countries with low shareholder protection. His results are consistent with the hypothesis that private benefits of control are discounted more by minority shareholders where external shareholder protections are weak. Gompers, Ishii, and Metrick (2006) similarly find that firm values are negatively related to insiders' voting rights, but positively related to

insiders' cash flow rights (see also La Porta, Lopez-de-Silanes, Shleifer and Vishny (2002) and Seifert, Gonenc and Wright (2002)).

Interestingly, Pajuste (2005) observes that an increasing number of firms in Europe are unifying their dual-class shares into a single class. She shows that the market value of the unifying firms goes up after the unification of the dual-classes of common stock. She also finds that compared to firms with similar growth opportunities, the firms that unify their dual-class stocks experience higher market value, but no significant difference in sales growth. Her findings further support the negative valuation effect of a dual-class structure.

While the literature has largely focused on the valuation effects of the separation of control and cash flow rights, the separation also has an important implication on stock liquidity, which has not been examined. We next lay out our reasoning.

2.3. The Liquidity Effect of Dual-Class Splits

As DeAngelo and DeAngelo (1985) and Grossman and Hart (1988) point out, insiders of dual-class firms have strong incentives to indulge in extracting private benefits of control and wealth diversionary behavior. The incentives could cause managers of dual-class firms to disclose less information and make their firms less transparent (see Tinaikar (2006)). Consistent with this argument, Doidge, Karolyi, Lins, Miller and Stulz (2005) show that when private benefits of control are high, controlling shareholders are less likely to choose to list their firm's shares in the U.S. because the higher standards for transparency and disclosure limit their ability to extract private benefits.

Low transparency in a dual-class firm could raise the degree of information asymmetry between market makers and informed investors. In a market with higher information asymmetry, market makers would face higher adverse selection costs, i.e., potential losses to informed investors. Glosten and Harris (1988), Stoll (1989), and Lin, Sanger and Booth (1995), among

others, show that the adverse selection costs are a significant component of dealers' market making costs. Furthermore, Lee, Mucklow and Ready (1993) demonstrate that market makers are sensitive to changes in information asymmetry and use both bid-ask spreads and depths to actively manage the risk. That is, as dealers face higher adverse selection costs, they widen bid-ask spreads and lower market depths to cover losses to the informed investors; thus effectively lowering stock liquidity. This reasoning suggests that dual-class splits that separate control from cash flow rights could change a firm's information environment, and increase market making costs for both classes of stocks.

Moreover, as mentioned earlier, a dual-class split could lead to different clienteles. Those who are interested in control will have a preference for superior-voting shares, and those who are interested in cash flow rights are more likely to hold inferior-voting shares. Since insiders can enjoy private benefits of control, they would belong to the former group. Also, superior-voting shares tend to sell at higher prices, reflecting largely private benefits of control (see Lease, McConnell and Mikkelson (1983) and Zingales (1995)). Hence, outside investors, who are interested in the firm but unlikely to participate in its control, are less likely to buy and hold shares of superior-voting rights. Indeed, Gompers, Ishii, and Metrick (2006) report that in the average dual-class firm, insiders hold approximately 60 percent of voting rights and 40 percent of cash flow rights. Consequently, dealers, who make markets in superior-voting shares, face a higher probability of trading with insiders. To mitigate possible losses to insiders in a higher information asymmetry environment, market makers would further widen bid-ask spreads and lower market depths for superior-voting shares.

Market makers could also widen bid-ask spreads and lower market depths for inferior-voting shares. Informed investors may prefer to use their informational advantage in trading inferior-voting shares for which the costs are less and the other parties to their trades are more likely to be less informed outside investors. This implies that dealers in inferior-voting shares

could face a relatively higher likelihood of trading with better informed investors after the dual-class adoption.

Taken together, the above arguments lead to the following hypotheses:

(H.1) Market makers raise bid-ask spreads following dual-class splits for both superior-voting and inferior-voting shares.

(H.2) Stock liquidity of both classes falls following dual-class splits.

(H.3) Dual-class splits have a different effect on stock liquidity than regular stock splits.

We next discuss our samples of dual-class splits and matched regular stock splits, and present the liquidity measures we use for testing the three hypotheses.

3. Data

3.1. Sample Selection

To identify dual-class splits, we first search the Center for Research in Security Prices (CRSP) files for issues with identical six-digit CUSIPs but different two-digit extensions to find firms with multiple traded share classes from 1980 through 2003, and find 310 firms. From this list, we exclude REITs, ADRs, closed-end funds, units, trusts, and firms whose multiple classes of shares did not trade concurrently. We also exclude firms with multiple traded shares due to various factors that trigger an entity change, such as tracking stocks, equity carve-outs, mergers & acquisitions, and Chapter 11 restructures. The exclusions reduce the list to 120 dual-class firms. We further remove from the list 46 firms whose dual-class structures were created using methods other than a stock split, e.g. public and private equity offerings, and optional exchanges,[9] and remove two firms with no data available on both the CRSP and the Compustat files. This results in our final sample of 72 firms whose dual-class structures were created through a stock split; and where both classes of common stock trade concurrently. For each of these 72 dual-class splits,

[9] An optional exchange involves the exchange of new class of shares for the currently outstanding shares on a voluntary basis.

we further crosscheck *Moody's Manuals* and the company's proxy statements to confirm the dual-class split.

One advantage of using the dual-class split sample to examine the liquidity effects of changes in the ownership structure is that we can observe the stock's liquidity attributes prior to a split and that we can also observe the liquidity attributes of both newly created classes of stocks after the split since both classes trade simultaneously. Another advantage is that stock splits are relatively "pure" corporate events that usually do not materially change the firms' capital structures and investment decisions. This allows us to hold firms' capital structure and other characteristics largely constant in our analysis.

One confounding effect, however, could arise from the stock split event itself. As we noted in the previous section, stock splits are usually viewed as an attempt to improve liquidity and make the shares more attractive to investors, even though studies that have examined the effect of regular stock splits on liquidity tend to find mixed results. If a dual-class ownership structure is created through a stock split and if it has no decisive effect on liquidity, we should find that our dual-class firms behave just like a sample of comparable firms that simply split their stocks but maintain the single-class status. For this reason, for each dual-class sample firm, we find a matched, comparable firm that went through a regular stock split contemporaneously.

Specifically, for each dual-class split, we first put regular-split firms in the matching pool if they (1) have a stock split within two months either before or after the dual-class split, (2) have a split ratio within 0.25 above or below the dual-class firm's split ratio, and (3) are in the same size quintile as the dual-class firm. Then, we compute the difference between the dual-class firm and each firm in the matching pool in split ratio, size and book-to-market equity ratio, and choose the one with the closest distance to the dual-class firm.[10] This procedure allows us to match firms

[10] We also experimented with an alternative matching process by choosing the matched firm if it (1) has a stock split within two months either before or after the dual-class split, (2) has a split ratio within 0.25 above or below the dual-class firm's split ratio, (3) is in the same size quintile as the dual-class firm, and (4) has the closest value in book-to-market ratio to the dual-class firm. The results are almost identical.

that are fairly comparable in size and book-to-market. As Liu (2006) points out, smaller firms and firms with higher book-to-market tend to have lower liquidity. Thus, matching firms with size and book-to-market (estimated prior to their stock split) helps control for pre-event liquidity.[11]

Indeed, as we will show, our matching procedure selects firms that are comparable in liquidity—there are no significant differences in various liquidity measures between the dual-class split sample and the matched regular split sample prior to the stock split. If dual-class splits affect liquidity differently than regular splits, as we hypothesize, then differences in the liquidity measures should show up after the split. We discuss the results of our comparisons in section 4.

Note that, for three dual-class splits, we cannot find matched firms with a comparable split ratio within two months either before or after the splits. We relax our criteria for these three observations and allow their matched firms to have the stock split within four months either before or after the dual-class splits. Of these three observations, we cannot find a matched firm with a split factor within 0.25 above or below a dual-class firm's split ratio of 4.[12] Instead, for this dual-class firm, we find a matched regular split firm with a split factor of 3.

The empirical results are virtually the same if we remove the three observations from the analyses. Hence, we report the results of our analyses for the entire sample of 72 dual-class splits and their 72 matched regular splits.

3.2. Characteristics of the Dual-Class and the Matched Firms

Table 1 compares the dual-class firms and the matched firms on split ratio, firm size, book-to-market and other characteristics prior to their split. For the sample 72 dual-class splits, the split factor ranges from 0.10 to 4, with an average of 1.10. Similarly, for the matched sample,

[11] It may also help control risk and expected returns (see Fama and French (1992) and Daniel and Titman (1997)).

[12] For this firm, a split factor of four means that shareholders would receive one superior-voting share and four inferior-voting shares for every original share they have.

the split factor ranges from 0.02 to 4, with an average of 1.08. The mean difference in the 72 paired comparisons is insignificantly different from zero. The mean difference in log firm size between the dual-class firms and the matched regular firms is also insignificantly different from zero. Thus, the two samples match quite well in the dimensions of split ratio and firm size.

In our matching procedure, the split ratio is the first consideration; size is the second, and then the book-to-market ratio. Even though we have considered book-to-market in our matching, our dual-class firms have a significantly higher average book-to-market ratio than the matched firms, 0.63 versus 0.44. Nevertheless, the relatively low average book-to-market ratios in both groups suggest that both the sample dual-class firms and the matched firms tend to have high growth opportunities.

On average, the institutional holdings account for 24.76% of outstanding shares of the dual-class firms, and 32.42% of outstanding shares of the matched firms, suggesting that these firms are by no means neglected by institutional investors. Prior to their stock split, both the dual-class firms and the matched firms have roughly the same average numbers of shareholders: 2.19 million vs. 2.24 million. We next analyze and report the effects of the dual-class and the regular stock splits on the respective investor base.

3.3. Investor Base and Dual-Class Splits

In a dual-class split existing shareholders receive both classes of shares to replace their old shares. Hence, if a shareholder owns 1% of the old shares before the split and if s/he keeps all the new shares, s/he would also own 1% of superior-voting shares and 1% of inferior-voting shares after the split. Therefore in the post-split period, under the null hypothesis, we should observe the same percentage of insiders' holdings for both classes of stocks as before the split, and the same number of shareholders in each class as before the split.

As we report in Table 2, in our sample of the 72 dual-class split firms, insiders on average held about 52.12% of all outstanding shares before the stock split. After the split, the average insider holdings of superior-voting shares significantly increases to 53.79%, but the average insider holdings of inferior-voting shares drops significantly to 41.28%. These results suggest that insiders prefer superior-voting shares to inferior-voting shares, and that dual-class splits allow them to maintain control of the firm with relatively low capital investment (see DeAngelo and DeAngelo (1995)).

Investor base, however, decreases significantly in both classes of stocks after the dual class split. The average number of shareholders of superior-voting shares significantly decreases to 1.61 million from 2.19 million before the split, and the average number of shareholders of inferior-voting shares also decreases significantly to 1.66 million. The decrease in investor base is consistent with Giannetti and Simonov (2004), who suggest that investor base may decrease when outside investors feel less protected.

In contrast, investor base increases following regular stock splits. The average number of shareholders increases to 2.99 million from 2.24 million before the regular stock splits. The increase in investor base is consistent with the findings of Lamoureux and Poon (1987) and Maloney and Mulherin (1992). Thus, while regular stock splits that maintain one share one vote make stocks more attractive to investors, dual-class splits that allow insiders to separate control from cash flow rights make them less so for investors.

The changes in insider holdings and in investor base are consistent with our assumption that managers of dual-class firms are entrenched and interested in private benefits of control and, thus, they have incentives to make their firms less transparent. Under this assumption, we predict that stock liquidity should decrease following dual-class splits. We next turn to our empirical results in Section 4. In section 5, we use cross-sectional analysis to further address the extent to which the changes in insider ownership and in investor base affect stock liquidity.

4. Empirical Results

4.1. Effective Spreads

Hasbrouck (2005) examines the extent to which daily data can be used to measure effective bid-ask spread, and shows that Roll's (1984) effective spread estimate and a Gibbs estimate of the effective spread achieve very high correlations with the corresponding estimates developed using New York Stock Exchange's Trade and Quote database (TAQ).[13] In particular, the Gibbs estimate has a correlation of 0.944 with the corresponding TAQ estimates. Hasbrouck's (2005) results suggest that one can use daily data to effectively infer the effective spread faced by traders.

Thus, to test our first hypothesis that bid-ask spreads increase following dual-class splits, we use both Roll's effective spreads and the Gibbs estimates, and report them in Tables 3 and 4, respectively.

4.1.1. Roll's Effective Spreads

We first look at Roll's effective spread. Roll's effective spreads are obtained using daily returns. Letting sp_i be Roll's effective spread for firm *i*, then $sp_i = \sqrt{-\text{cov}(r_{i,t}, r_{i,t-1})}$, where $r_{i,t}$ is firm *i*'s stock return on day *t*. Following Harris (1990) and Hasbrouck (2005), we set $sp_i = 0$ if $\text{cov}(r_{i,t}, r_{i,t-1}) > 0$.[14] We obtain the pre-split estimate of sp_i for each of the dual-class split sample firms and regular split matched firms using 100 daily returns from day -110 to day -11 relative to the announcement date; and the post-split estimate from day 11 through day 110 relative to the ex-distribution date.

[13] The Gibbs estimate is based on Roll's spread model and further developed by Hasbrouck (2004).

[14] Roll's (1984) spread does not exist when $\text{cov}(r_{i,t}, r_{i,t-1}) > 0$. Harris (1990) finds that positive autocovariances are more likely to be associated with low values of the spread, and suggests setting the spread estimate to an *a priori* value of zero as a remedy to the problem.

Panel A of Table 3 shows the average pre-split and post-split Roll's effective spreads for the superior-voting shares. Before the dual-class splits, the average effective spread is 0.639%. It increases to 1.035% following the dual-class split, a 62 percent increase! The increase of 0.396% in the average effect spread is significant at the 1% level.

For the matched regular splits, there is almost no change in the average effective spread following the split. The average pre-split spread is 0.51% and the average post-split spread is 0.481%. With a t-value of -0.34, the decrease of -0.029% in the average effective spread is insignificantly different from zero.

Interestingly, the average pre-split effective spreads are about the same for our dual-class firms and matched firms—0.639% vs. 0.510%. The difference is insignificantly different from zero. But, the average effective spread following the dual-class split is significantly wider than that following the regular splits—1.035% vs. 0.481%. The result is consistent with our view that dual-class splits are different from regular splits, in terms of their impact on stock liquidity.

The results in Panel B of Table 3 for the inferior-voting shares are very similar to those reported in Panel A and discussed above. Specifically, for the inferior-voting shares, the average effective spread is 0.639% before the split, and it increases to 1.121% after the split. The increase is statistically significant at the 1% level.

Thus, the results are consistent with our first hypothesis that dual-class splits raise market making costs, which effectively increase trading costs faced by investors, for both superior-voting and inferior-voting shares. The results are also consistent with our third hypothesis that dual-class splits have a different effect on stock liquidity than regular splits.

4.1.2. The Gibbs Estimates of the Effective Spread

Hasbrouck (2004, 2005) advocates Bayesian estimation of Roll's (1984) effective spread using the Gibbs sampler because it produces a relatively accurate estimate of the effective spread.

As Hasbrouck (2005) suggests, one advantage of the Gibbs estimate over the moment estimate is that "the prior can restrict the effective cost estimates to be positive." Because Roll's spread is set to zero when covariances are positive, Gibbs estimates are generally higher than the moment estimates of Roll's spread.

We obtain the Gibbs estimates from Professor Joel Hasbrouck's website which provides annual series of the Gibbs estimates for each CRSP firm. [15] However, in a given year, a new estimate is provided "if there is a change of listing venue, share code, share class, or if the CRSP cumulative price adjustment factor changes by more than 10%." We include in the analyses the pre-split (post-split) Gibbs estimate in the year of the split for each of the dual-class split firms and the matched regular split firms if the estimate is not missing and the number of observations used in the Gibbs estimate is more than 50 before the announcement date (after the ex-distribution date).[16] Otherwise, we use the previous (next) year's estimate.

Panel A of Table 4 reports the average pre- and post-split Gibbs estimates of the effective spread for superior-voting shares, and Panel B for inferior-voting shares. As expected, the Gibbs estimates are higher than the corresponding moment estimates of Roll's spread reported in Table 3. Other than that, the Gibbs estimates behave like the moment estimates—the average effective spread for superior-voting shares increases significantly from 0.979% before the split to 1.563% after the split; and also for the inferior-voting shares, it increases significantly from 0.979% to 1.495%.[17]

In contrast, there is no significant change in the average effective spread for the matched regular splits. Their average post-split Gibbs estimate of 0.902% is insignificantly different from their average pre-split Gibbs estimate of 0.757%. Also, the difference in the effective spread

[15] We thank Professor Hasbrouck for making the data available in his website, http://pages.stern.nyu.edu/~jhasbrou/Research/GibbsEstimates2005/Liquidity%20estimates%202005.htm.
[16] Hasbrouck (2005) suggests that the Gibbs estimate is usually not reliable if the number of observations used is less than 50.
[17] We are able to obtain 60 pre-split Gibbs estimates and 66 post-split Gibbs estimates for our 72 dual-class splits. For the 72 matched regular splits, the corresponding numbers are 61 and 68.

between the dual-class split sample and the matched sample is insignificant before the split. But, the average effective spreads of both superior-voting and inferior voting stocks are significantly wider than the average effective spreads of the matched stocks after the split.

Thus, the results based on the Gibbs estimates of the effective spread confirm our earlier findings that market makers widen the spreads following dual-class splits for both superior-voting and inferior-voting stocks, and that the spread widening is only significant for dual-class splits, and not for the regular stock splits.

4.2. Amihud's Illiquidity Measure

Amihud (2002) proposes an illiquidity measure and shows a positive stock return-illiquidity relation, which implies that investors require an illiquidity premium. We next use his illiquidity measure to test our hypothesis that illiquidity increases following dual-class splits.

We estimate Amihud's illiquidity measure by $il_i = \frac{1}{100}\sum_{t=1}^{100}\frac{|r_{i,t}|}{vol_{i,t}}$, where $r_{i,t}$ and $vol_{i,t}$ are stock *i*'s return and dollar trading volume on day *t*, respectively. Amihud (2002) suggests that his illiquidity measure can be interpreted as "the daily price response associated with one dollar of trading volume, thus serving as a rough measure of price impact." The larger the price impact of trades, the higher the illiquidity of the stock.

We obtain the pre-split illiquidity measure for each of the dual-class split and the matched regular split firms using the returns and dollar volume from day -110 to day -11 relative to the announcement date, and the post-split measure using the returns and dollar volume from day 11 to 110 relative to the ex-distribution date. Panel A of Table 5 reports the average pre- and post-split illiquidity measures for superior-voting shares, and Panel B for inferior-voting shares.

As observed for Roll's effective spreads and the Gibbs estimates, Amihud's illiquidity measure increases significantly following the dual-class splits for both superior- and inferior-

voting stocks. In contrast, there is virtually no change in Amihud's illiquidity measure following the matched regular splits.

Thus, the evidence is consistent with our hypothesis that dual-class splits have an adverse effect on stock liquidity. The evidence implies that investors would demand higher illiquidity premiums on both superior- and inferior-voting stocks following dual-class splits.

4.3. Liu's (2006) *LMx*

Liu (2006) argues that "since liquidity is multidimensional, existing measures inevitably demonstrate a limited ability to capture liquidity risk fully and they may be inaccurate even in the dimension they aim to capture." He proposes a new liquidity measure, *LMx*, to capture four important dimensions of liquidity—trading quantity, trading cost, price impact, and particularly trading speed. These four dimensions of liquidity are important and adequate because "Liquidity is generally described as the ability to trade large quantities quickly at low cost with little price impact."

Liu (2006) formulates his *LMx* as

$$LMx = \left[\text{Number of zero daily volumes in prior } x \text{ months} + \frac{1/(x\text{-month turnover})}{Deflator}\right] \times \frac{21x}{NoTD},$$

where *x*-month turnover is turnover over the prior *x* months, calculated as the sum of daily turnover over the prior *x* months; daily turnover is the ratio of the number of shares traded on a day to the number of shares outstanding at the end of the day, *NoTD* is the total number of the trading days in the market over the prior *x* months, and *Deflator* is chosen such that

$0 < \frac{1/(x\text{-month turnover})}{Deflator} < 1$ for all sample stocks. (e.g., Liu chooses a deflator of 11,000 in constructing his *LM6* and *LM12*.)

Liu (2006) uses the number of zero daily trading volumes over the prior *x* months to capture "the continuity of trading and the potential delay or difficulty in executing an order. In other words, the absence of trade in a security indicates its degree of illiquidity." The number of daily zero trading volumes can also reflect the trading cost dimension of liquidity because, according to Lesmond, Ogden and Trzcinka's (1999) model, no trades occur if transaction costs are high and the information value to trading does not exceed the transaction cost threshold. Liu uses the turnover adjustment part to capture the dimension of trading quantity. In sum, as Liu points out, "*LMx* uses the pure number of zero daily trading volumes over the prior x months to identify the least liquid stocks, but it relies on turnover to distinguish the most liquid among frequently traded stocks as classified by the pure number of zero trading volumes." Empirically, Liu shows that *LMx* are highly correlated with the commonly used bid-ask spread, turnover, and price impact measures. More importantly, Liu documents that significant illiquidity premiums are associated with stocks with high *LMx*, and that the illiquidity premiums subsume the effects of firm size, book-to-market, cash-flow-to-price, earnings-to-price, dividend yield, and long-run contrarian investment.

Thus, in this subsection we use Liu's *LM6* and *LM12* to further test our hypothesis that dual-class splits cause stocks to become less liquid. *LM6* and *LM12* can be interpreted as the turnover-adjusted number of zero daily trading volume over the prior 126 and 252 trading days, respectively. Table 6 reports the results based on *LM6*, and Table 7 is based on *LM12*.

According to Table 6, the sample stocks have an average of 9.69 days of turnover-adjusted no trade during six months prior to the month of the dual-class splits. For the superior-voting (inferior-voting) stocks, the average of the turnover-adjusted no trade days significantly increases to 17.58 (13.70) days during six months following the month of the stock split. In contrast, for the matched regular split stocks, the average of the turnover-adjusted no trade days significantly decreases from 12.16 days before the split to 6.16 days after the split. These results

clearly suggest that, unlike regular splits that improve the difficulty of order execution, dual-class splits result in higher order execution difficulty and make both classes of stocks less liquid.

We obtain similar results in Table 7, based on *LM12*, which show changes in liquidity over a longer time period. In particular, for the superior-voting (inferior-voting) stocks, the average number of turnover-adjusted no trade days increases significantly by 17.35 (7.28) during the 12 month period following the month of the stock split; compared to the 12 month period preceding the split. For the matched regular split stocks, the average number of turnover-adjusted no trade days decreases significantly by 12.96. Therefore, the evidence based on Liu's (2006) multidimensional liquidity measures, *LM6* and *LM12*, suggest that while regular splits improve liquidity, dual-class splits reduce liquidity.

Together, the results in Tables 3 through 7 suggest that investors face higher effective spreads, trades have larger price impact, and order execution difficulty increases following dual-class splits. The evidence is consistent with our hypothesis that managers and insiders of dual-class firms, who are interested in private benefits of control, have incentives to disclose less information and make the firm less transparent, which in turn causes market makers to face higher adverse information risk. In response to an increase in the risk, market makers widen spreads and lower depths, causing the stocks to become less liquid.

5. Cross-Sectional Analyses

Both dual-class splits and regular stock splits result in changes in the price level and the number of shares outstanding. Also, as shown in Table 2, there are changes in share turnover and the investor base following the split. In this section we investigate whether the increased illiquidity following the dual-class splits are related to changes in theses factors.

Specifically, we use cross-sectional regression analysis to investigate whether the liquidity effects of dual-class splits can be explained by four variables—changes in the price level

(Δ Price), changes in share turnover (Δ Turnover), changes in number of shareholders (Δ Investor base), and changes in the percentage of institutional holdings (Δ Inst. holding). The rationale for including these variables is as follows. First, because of tick size, stocks with lower price levels tend to have higher percentage bid-ask spreads, suggesting that stock splits, which lower the price levels, could reduce liquidity. On the other hand, it is easier for small investors to trade when the price levels are lower, suggesting an improvement in trade difficulty. Thus, stock splits that lower the price levels could have a negative effect on Roll's effective spreads, but should have a positive effect on Liu's liquidity measures. Second, share turnover is an important determinant of liquidity, and should be positively related to the liquidity measures. Third, we expect that changes in liquidity and changes in investor base are related because stocks with greater liquidity may attract more investors, and also because as more investors participate, stock liquidity could improve. As for institutional holdings, Gompers and Metrick (2001) find that institutional investors tend to prefer stocks that are larger and more liquid. Hence, changes in liquidity and changes in institutional holdings could be correlated.

Table 8 reports the results of regressing changes in each of our liquidity measures on the four explanatory variables, plus indicator variables, *Superior* and *Inferior*. *Superior* takes on the value of one for superior-voting shares of a dual-class split, and is zero otherwise; likewise, *Inferior* takes on the value of one for inferior-voting shares of a dual-class split, and is zero otherwise. The liquidity measures are Roll's (1984) effective spread (SP), Hasbrouck's (2005) Gibbs estimate of the effective spread (GSP), Amihud's (2002) illiquidity measure (IL), and Liu's (2006) standardized turnover-adjusted number of zero daily trading volumes, LM6 and LM12. The observations in each regression include the dual-class splits and the matched regular splits.

For each of the liquidity measures, we first run a regression of changes in the liquidity measure on the two indicator variables, *Superior* and *Inferior*. The intercept term of the regression reflects the average change in the liquidity measure associated with the regular stock splits, and the coefficient estimate for the dummy variable *Superior* (*Inferior*) reflects the

incremental liquidity effect associated with superior-voting (inferior-voting) shares in dual-class splits. In each of the regressions, the coefficient estimates of *Superior* and *Inferior* are significantly positive, suggesting that illiquidity increases for both classes of stocks following dual-class splits. The results confirm our earlier findings that dual-class splits have adverse effects on liquidity, and that the effects are significantly different from the liquidity effects of regular stock splits.

However, changes in liquidity following dual-class splits can be partially explained by ΔPrice and ΔTurnover. For example, in model 10, Δ*LM12* is positively related to ΔPrice and negatively related to ΔTurnover. The positive relation with ΔPrice implies that as the price level is adjusted lower through a stock split, the number of zero daily trading volumes decreases, indicating that stock splits with a larger split factor tend to result in more liquidity improvement. The negative relation with ΔTurnover implies that stock splits that generate an increase in share turnover lead to liquidity improvement, in terms of a lower number of zero daily trading volumes.

Nevertheless, the coefficient estimates for both *Superior* and *Inferior* remain significantly positive for all regression models except the one with Amihud's illiquidity measure (model 6). These results suggest that the adverse effect of dual-class splits on liquidity can not be fully explained by changes in the price level, changes in share turnover, changes in number of shareholders, or change in the percentage of institutional holdings.

6. Concluding Remarks

Dual-class splits are interesting corporate events that involve stock splits and changes in firms' ownership structures from one share one vote to two classes of stocks with disparate voting rights and where both classes of stock trade concurrently.

We notice two remarkable changes in the ownership structures in our 72 sample firms that undertake a dual-class split. First, prior to the stock split, insiders own about 52% of the

outstanding shares for the average firm in our sample. After the split, on average, insiders increase their ownership slightly to 54% of superior-voting shares, but substantially decrease their ownership of inferior-voting shares to 41%. This result suggests that dual-class splits allow insiders to maintain their control of the firm, while cashing out part of their holdings in inferior-voting shares. Second, for both classes of stocks, investor base (the number of shareholders) significantly decreases following the dual-class stock split. The evidence is consistent with the assumption that a dual-class restructuring raises investors' concerns about management entrenchment and wealth expropriation.

Under this assumption, we hypothesize that market makers would widen bid-ask spreads and lower depths following dual-class splits because managers and insiders of dual-class firms, who are entrenched and interested in private benefits of control, have incentives to disclose less information and make the firm less transparent, which in turn causes market makers to face higher information asymmetry risk.

Consistent with this hypothesis, we find that Roll's (1984) effective spread, Amihud's (2002) illiquidity measure, and Liu's (2006) *LM6* and *LM12*, the turnover-adjusted numbers of zero daily trading volumes, significantly increase for both superior-voting and inferior-voting shares following the dual-class splits. For a matched sample of regular splits, we find that Liu's (2006) *LM6* and *LM12* improve following the splits, and that there are no changes in Roll's effective spread and Amihud's (2002) illiquidity measure. This result suggests that the adverse effects of dual-class splits on liquidity that we document here are not due to stock splits per se.

The issue we examine is important because these results further our understanding of the costs to firms in dual-class restructuring. Our findings imply that dual-class splits that create an extreme form of corporate governance tend to destroy stock liquidity, which leads investors to face higher trading costs and require higher illiquidity premiums. While the literature has suggested that investors may be willing to pay less for dual-class stocks because of possible

management expropriation, our findings add to the literature that illiquidity is also a factor that may cause investors to find dual-class stocks less attractive.

Furthermore, Butler, Grullon and Weston (2005) find that investment banking fees are significantly higher for firms with less liquid stocks. This implies that the increases in illiquidity may cause dual-class firms to pay higher direct costs of raising external capital to finance their growth opportunities.

In sum, there are substantial costs associated with the increase in illiquidity following dual-class splits, which affects many market participants—it raises dealers' market making costs, investors' trading costs, the firms' cost of capital, and possibly the firms' investment banking (underwriting) fees.

References

Amihud, Y., and H. Mendelson, 1986, Asset Pricing and the Bid-Ask Spread, *Journal of Financial Economics* 17, 223–49

Amihud, Y., 2002. Illiquidity and stock returns: cross-section and time-series effects, *Journal of Financial Markets* 5, 31–56.

Baker, H. and P. Gallagher, 1980, Management view of stock splits, *Financial Management* 9, 73-77.

Baker, H. and G. Powell, 1993, Further evidence on managerial motives for stock splits, *Quarterly Journal of Business and Economics* 22, 83-102.

Bebchuk, L. A., and A. Cohen, 2005, The cost of entrenched boards, *Journal of Financial Economics* 78, 409-433.

Bebchuk, L., A. Cohen and A. Ferrell, 2005, What matters in corporate governance, The Harvard John M. Olin discussion paper series.

Berle, A.A., and G.C. Means, 1932, The Modern Corporation and Private Property (Macmillian, New York).

Brockman, P., and D.Y. Chung, 2003, Investor protection and firm liquidity, *Journal of Finance* 58, 921–938.

Butler, A.W., G. Grullon, and J.P. Weston, 2005, Stock market liquidity and the cost of issuing equity, *Journal of Financial and Quantitative Analysis* 40, 331-348.

Claessens, S., S. Djankov, J.P.H. Fan and L.H.P. Lang, 2002, Disentangling the incentive and entrenchment effects of large shareholdings, *Journal of Finance* 58, 81-112.

Chung, H., 2006, Investor Protection and the Liquidity of Cross-Listed Securities: Evidence from the ADR Market, *Journal of banking and Finance* 30, 1485-1505.

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

Copeland, T., 1979, Liquidity Changes Following Stock Splits, *Journal of Finance* 34, 115-141.

Core, J., W. Guay, and T. Rusticus, 2005, Does weak governance cause weak stock returns? An examination of firm operating performance and investors' expectations, *Journal of Finance*, forthcoming.

Daniel, K., and Titman, S., 1997, Evidence on the characteristics of cross sectional variation in stock returns, *Journal of Finance* 52, 1–33.

DeAngelo, H., and L. DeAngelo, 1985, Managerial ownership of voting rights, *Journal of Financial Economics* 14, 33-69.

Demsetz, H., 1983, The structure of ownership and the theory of the firm, Journal of Law and Economics 26 (2), 375-390.

Dhar, R., W. N. Goetzmann, S. Shepherd, and N. Zhu, 2004, The impact of clientele changes: evidence from stock splits, *working paper.*

Dimitrov, V., and P. Jain, 2006, Recapitalization of one class of common stock into dual class: growth and long-run stock returns, *Journal of Corporate Finance* 12, 342-366.

Doidge, C., G. A. Karolyi, K.V. Lins, D. P. Miller, and R. M. Stulz, 2005, Private benefits of control, ownership, and the cross-listing decision, *NBER Working Paper Number 11162*.

Easley, D., M. O'Hara, and G. Saar, 2001, How stock splits affect trading: a microstructure approach, *Journal of Financial and Quantitative Analysis* 36, 25-51.

Eleswarapu, V. R., and K. Venkataraman, 2006, The impact of legal and political institutions on equity trading costs: a cross-country analysis, *Review of Financial Studies* 19(3), 1081-1111.

Fama, E. F., and French, K. R., 1992, The cross-section of expected stock returns, *Journal of Finance* 47, 427-465.

Frieder, L. and R. Martell, 2006, Capital structure and equity liquidity: A bi-directional relationship, working paper, Purdue University.

Giannetti, M. and A. Simonov, 2004, Which investors fear expropriation? Evidence from investors' stock picking, working paper, Stockholm School of Economics.

Glosten L., and Harris L., 1988, Estimating the components of the bid–ask Spread, *Journal of Financial Economics* 21, 123–142.

Gompers, P. A., J. Ishii, and A. Metrick, 2003, Corporate governance and equity prices, *Quarterly Journal of Economics* 118, 107- 155.

Gompers, P. A., J. Ishii, and A. Metrick, 2006, Extreme governance: an analysis of dual-class firms in the United States, working paper.

Gompers, P. A. and A. Metrick, 2001, "Institutional Investors and Equity Prices," *Quarterly Journal of Economics* 116, 229-259.

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

Harris, L., 1990, Statistical properties of the roll serial covariance bid/ask spread estimator, *Journal of Finance* 45, 579-590.

Hasbrouck, J., 2004, Liquidity in the futures pit: inferring market dynamics from incomplete data, *Journal of Financial and Quantitative Analysis* 39, 305-326.

Hasbrouck, J., 2005, Trading costs and returns for US equities: the evidence from daily data, *working paper*, New York University.

Holmstrom, B., and Tirole, J., 2001, LAPM: a liquidity-based asset pricing model, *Journal of Finance* 56, 1837–1867.

Jarrell, G. A., and A. B. Poulsen, 1988, Dual-class recapitalizations as anti-takeover mechanisms: the recent evidence, *Journal of Financial Economics* 20, 129-152.

Jensen, M. C., and W.H. Meckling, 1976, Theory of the firm: Managerial behavior, agency costs, and ownership structure, *Journal of Financial Economics* 3, 305-360.

Jensen, M. C., and R. S. Ruback, 1983, The market for corporate control: the scientific evidence, *Journal of Financial Economics* 11, 5-50.

Kadapakkam, R., S. Krishnamurthy, and Y. Tse, 2007, Stock Splits, Broker Promotion and Decimalization**,** *Journal of Financial and Quantitative Analysis*, Forthcoming.

La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny, 2002, Investor protection and corporate valuation, *Journal of Finance* 57, 1147-1170.

Lakonishok, J., and B. Lev, 1987, Stock splits and stock dividends: why, who, and when? *Journal of Finance* 42, 913–32.

Lamoureux, C. G. and P. Poon, 1987, How the market reacts to a stock split? *Journal of Finance* 42 (5), 1347-1370.

Lease, R., J. McConnell, and W. Mikkelson, 1983, The market value of control in public corporations, *Journal of Financial Economics*, 439-472.

Lee, C., B. Mucklow, and M. Ready, 1993, Spreads depths and the impact of earnings information: an intraday analysis, *Review of Financial Studies* 6, 345-374.

Lehn, K., J. Netter, and A. Poulsen, 1990, Choice of organizational form: the case of leveraged recapitalizations and leveraged buyouts, *Journal of Financial Economics* 27, 315-354.

Lemmon, M.L., and K.V. Lins, 2003, Ownership structure, corporate governance, and firm value: Evidence from the East Asian financial crisis, *Journal of Finance* 58, 1445-1468.

Lin, J., G. Sanger, and G.G. Booth, 1995, Trade size and components of the bid-ask spread, *Review of Financial Studies* 8, 1153-1183

Lins, K.V., 2003, Equity ownership and firm value in emerging markets, *Journal of Financial and Quantitative Analysis* 38, 159-184.

Lipson, M.L., 2003, Market microstructure and corporate finance, *Journal of Corporate Finance* 9, 377-384.

Lipson, M.L. and S. Mortal, 2004, Capital structure decisions and equity market liquidity, working paper, University of Virginia.

Liu, W., 2006, A liquidity-augmented capital asset pricing model, *Journal of Financial Economics*, 631-671.

Maloney, M., and H. Mulherin, 1992, The effects of splitting on the ex: a microstructure reconciliation, *Financial Management* 21, 44-59.

Masulis, R., C. Wang, and F. Xie, 2006, Corporate governance and acquirer returns, *Journal of Finance*, forthcoming.

Masulis, R., C. Wang, and F. Xie, 2006, Agency problems at dual-class companies, working paper, Vanderbilt University.

Merton, R., 1987, A simple model of capital market equilibrium with incomplete information, *Journal of Finance* 42, 483–510.

Pajuste, A., 2005, Determinants and Consequences of the unification of dual-class shares, European Center Bank working paper series No. 465.

Partch, M., 1987, The creation of a class of limited voting stock and shareholders' wealth, *Journal of Financial Economics* 18, 313-339.

Roll, R., 1984, A simple implicit measure of the effective bid-ask spread in an efficient Market, *Journal of Finance* 39, 1127-1139.

Shleifer A. and Vishny R. W., 1997, A survey of corporate governance, *Journal of Finance* 52, 737-83.

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

Seifert, B., H. Gonenc, and J. Wright, 2002, The international evidence on performance, investment, and equity ownership by insiders and blockholders, *European Management Association Working Paper*.

Stoll, H. R., 1989, Inferring the components of the bid-ask spread: theory and empirical tests, *Journal of Finance* 44, 115-134.

Stulz, R. M., 1988, Managerial control of voting rights: financing policies and the market for corporate control, *Journal of Financial Economics* 20, 25-54.

Tinaikar, S., 2006, The disclosure effects of dual class ownership structures, *working paper*, University of Toronto.

Zingales, L., 1995, What Determines the Value of Corporate Votes? *Quarterly Journal of Economics* 110, 1047-1073.

Table 1. Summary Statistics

This table reports the summary statistics of several variables for the 72 dual-class firms versus the 72 matched firms before the announcement of their stock splits. *Split Ratio* is the stock split ratio as reported in proxy statements for dual class firms and is obtained for the matched stocks from CRSP. *Market Cap* is market value in millions at day -5 relative to the ex-distribution date. *BM* is the ratio of book equity value (Compustat item 60 + item 74) to market equity value at day -5 relative to the distribution. *Shr Price* is the closing price or bid/ask average, and *Shrout* is the total number of shares outstanding in millions at day -5 relative to the distribution. *Turnover* is the average of daily ratios of the number of shares traded to the number of shares outstanding from day -110 to day -11 relative to the announcement date. *Investor Base* is the number of shareholders in millions as reported in Moody's Manual for dual class firms and the number of shareholders (Compustat item 100) in millions for the matched stocks before the splits. *Insider Own* is insider ownership in percentage as reported in proxy statements before the splits. *Institution Own* is 13f institutions' stock ownership in percentage in the calendar quarter before the splits from Thomson Financial.

	Dual-Class firms	Regular split firms	Paired t-test	Signed-Rank test p-value
Split Ratio	1.10	1.08	1.40	0.1982
Market Cap	292.07	452.33	-1.12	0.9778
BM	0.63	0.44	3.16***	<.0001***
Shr Price	32.73	39.40	-2.55**	0.0012***
Shrout	8.19	8.61	-0.33	0.0136**
Turnover	0.0030	0.0051	-2.12**	0.0697*
Investor Base	2.19	2.24	-0.73	0.5114
Insider Own	52.12	24.38	8.93***	<.0001***
Institution Own	24.76	32.42	-2.52**	0.0342**

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level.

Table 2. Characteristics of Superior vs. Inferior Voting Stocks

This table reports characteristics of the 72 dual-class firms surrounding the adoption of a dual-class ownership structure, and of the 72 matched firms surrounding their stock splits. *Voting Right* is the voting right per share as reported in proxy statements. Pre-split *Shr Price* is the closing price or bid/ask average at day -5 relative to the ex-distribution date; and post-split estimate at day 5 relative to the distribution date. Pre-split *Turnover* is the average of daily ratios of the number of shares traded to the number of shares outstanding from day -110 to day -11 relative to the announcement date; and post-split estimate from day 11 to day 110 relative to the ex-distribution date. Pre-split *Investor Base* is the number of shareholders in millions as reported in Moody's Manual before the splits; and post-split estimate after the splits. Pre-split *Insider Own* is insider ownership in percentage as reported in proxy statements before the splits; and post-split estimate after the splits. Pre-split *Institution Own* is 13f institutions' stock ownership in percentage in the calendar quarter before the splits; and post-split estimate after the splits from Thomson Financial. Pre-split *No. of Institutions* is the number of 13f institutions who hold stocks in the calendar quarter before the splits; and post-split estimate after the splits.

Panel A: The 72 Dual-Class Splits

	Before Dual-class Splits	After the Splits	
		Superior-Voting Class	Inferior-Voting Class
Voting Right	1.00	3.71*	0.19***
Shr Price	32.73	17.21***	16.39***
Turnover	0.0030	0.0021***	0.0033
Investor Base	2.19	1.61***	1.66***
Insider Own	52.12	53.79**	41.28***
Institution Own	24.76	22.50	26.34
No. of Institutions	23.71	20.17	21.89

Panel B: The 72 Matched Regular Splits

	Before Splits	After Splits
Voting Right	1.00	1.00
Shr Price	39.40	19.55***
Turnover	0.0051	0.0049
Investor Base	2.24	2.99**
Insider Own	24.38	23.02*
Institution Own	32.42	31.53
No. of Institutions	38.61	42.90***

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level.

Table 3. Roll's Effective Spread Surrounding the 72 Dual-Class Splits

This table reports the means of Roll's (1984) effective spread estimates before and after the 72 sample firms adopted a dual-class (DC) ownership structure. The estimate is $sp_i = \sqrt{-\text{cov}(r_{i,t}, r_{i,t-1})}$; and following Harris (1990), we set $sp_i = 0$ if $\text{cov}(r_{i,t}, r_{i,t-1}) > 0$. We obtain the before-DC estimate for each sample firm using daily returns from day -110 to day -11 relative to the announcement date; and the after-DC estimate from day 11 through day 110 relative to the ex-DC distribution date. For each sample firm, we find a matched firm that split its stock within two months either before or after the dual-class firm's stock split with a comparable split ratio (within 0.25 above or below the dual-class firm's split ratio) and that had similar size (i.e., market capitalization) and similar book-to-market ratio.

	After Ex-Distribution Day (%)	Before Split Announcement Day (%)	Difference Between After and Before Split (%)	Paired t-Test (p-value)	Signed-Rank Test (p-value)
Panel A: Superior Voting Stocks					
(1) DC Stocks	1.035	0.639	0.396	2.78*** (0.0070)	258*** (0.0025)
(2) Matched Stocks	0.481	0.510	-0.029	-0.34 (0.7343)	-45 (0.6555)
Difference, (1)-(2)	0.554	0.128	0.426	2.63** (0.0103)	405*** (0.0036)
Paired t-test (p-value)	2.96*** (0.0041)	1.11 (0.2674)			
Signed-Rank Test (p-value)	296*** (0.0032)	83 (0.4257)			
Panel B: Inferior Voting Stocks					
(1) DC Stocks	1.121	0.639	0.482	3.89*** (0.0002)	401*** (0.0001)
(2) Matched Stocks	0.481	0.510	-0.029	-0.34 (0.7343)	-45 (0.6555)
Difference, (1)-(2)	0.640	0.129	0.511	3.14*** (0.0025)	492*** (0.0012)
Paired t-test (p-value)	3.84*** (0.0003)	1.11 (0.2674)			
Signed-Rank Test (p-value)	466*** (<.0001)	83 (0.4257)			

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level.

Table 4. Gibbs Estimates of Roll's Effective Spread Surrounding the 72 Dual-Class Splits

This table reports the means of Gibbs estimates of Roll's (1984) effective spread before and after the 72 sample firms adopted a dual-class (DC) ownership structure. We obtained the Gibbs estimates from Professor Joel Hasbrouck's website, http://pages.stern.nyu.edu/~jhasbrou/Research/GibbsEstimates2005/Liquidity%20estimates%202005.htm. It provides annual series of the Gibbs estimates for each CRSP firm. However, in a given year, a new estimate is provided "if there is a change of listing venue, share code, share class, or if the CRSP cumulative price adjustment factor changes by more than 10%." Hasbrouck (2005) examines various liquidity measures, based on daily data, and concludes that "a Gibbs estimate of the effective cost stands out, achieving a correlation of 0.944 with the corresponding TAQ estimates." We obtain the before-DC (after-DC) Gibbs estimate for each sample firm if the estimate is not missing and the number of days used in the Gibbs estimate is more than 50 before (after) the ex-distribution date in the year of adopting DC. Otherwise, we use the previous (next) year's estimate. For each sample firm, we find a matched firm that split its stock within two months either before or after the dual-class firm's stock split with a comparable split ratio (within 0.25 above or below the dual-class firm's split ratio) and that had similar size (i.e., market capitalization) and similar book-to-market ratio.

	After Ex-Distribution Day (%)	Before Split Announcement Day (%)	Difference Between After and Before Split (%)	Paired t-Test (p-value)	Signed-Rank Test (p-value)
Panel A: Superior Voting Stocks					
(1) DC Stocks	1.563	0.979	0.692	4.71*** (<.0001)	582*** (<.0001)
(2) Matched Stocks	0.902	0.757	0.102	1.46 (0.1486)	325** (0.0154)
Difference, (1)-(2)	0.654	0.200	0.574	3.17*** (0.0025)	240** (0.0319)
Paired t-test (p-value)	3.02*** (0.0036)	1.43 (0.1565)			
Signed-Rank Test (p-value)	398*** (0.0098)	177 (0.1276)			
Panel B: Inferior Voting Stocks					
(1) DC Stocks	1.495	0.979	0.611	4.84*** (<.0001)	663*** (<.0001)
(2) Matched Stocks	0.902	0.757	0.102	1.46 (0.1486)	325** (0.0154)
Difference, (1)-(2)	0.546	0.200	0.453	3.01*** (0.0040)	379*** (0.0007)
Paired t-test (p-value)	3.37*** ().0012)	1.43 (0.1565)			
Signed-Rank Test (p-value)	570*** (0.0003)	177 (0.1276)			

***Significant at the 1% level; **Significant at the 5% level.

Table 5. Amihud's Illiquidity Measure Surrounding the 72 Dual-Class Splits

This table reports the means of Amihud's (2002) Illiquidity Measure before and after the 72 sample firms adopted a dual-class (DC) ownership structure. The estimate is $il_i = \frac{1}{100}\sum_{t=1}^{100}\frac{|r_{i,t}|}{p_{i,t}\times vol_{i,t}}$. We obtain the before-DC estimate for each sample firm using daily return ($r_{i,t}$), closing price ($p_{i,t}$), and volume ($vol_{i,t}$) from day -110 to day -11 relative to the announcement date; and the after-DC estimate from day 11 through day 110 relative to the ex-DC distribution date. For each sample firm, we find a matched firm that split its stock within two months either before or after the dual-class firm's stock split with a comparable split ratio (within 0.25 above or below the dual-class firm's split ratio) and that had similar size (i.e., market capitalization) and similar book-to-market ratio.

	After Ex-Distribution Day (10^{-6})	Before Split Announcement Day (10^{-6})	Difference Between After and Before Split (10^{-6})	Paired t-Test (p-value)	Signed-Rank Test (p-value)
Panel A: Superior Voting Stocks					
(1) DC Stocks	4.443	0.960	3.590	2.35** (0.0217)	960*** (<.0001)
(2) Matched Stocks	0.550	0.782	-0.240	-1.12 (0.2656)	-79 (0.6380)
Difference, (1)-(2)	3.913	0.170	3.839	2.54** (0.0133)	911*** (<.0001)
Paired t-test (p-value)	2.62** (0.0108)	1.01 (0.3139)			
Signed-Rank Test (p-value)	924*** (<.0001)	429*** (0.0064)			
Panel B: Inferior Voting Stocks					
(1) DC Stocks	4.701	0.960	3.902	2.01** (0.0480)	912*** (<.0001)
(2) Matched Stocks	0.550	0.782	-0.240	-1.12 (0.2656)	-79 (0.6380)
Difference, (1)-(2)	4.200	0.170	4.151	1.96* (0.0540)	878*** (<.0001)
Paired t-test (p-value)	2.08** (0.0412)	1.01 (0.3139)			
Signed-Rank Test (p-value)	955 (<.0001)	429*** (0.0064)			

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level.

Table 6. Liu's *LM6* Surrounding the 72 Dual-Class Splits

This table reports the means of Liu's (2006) LM6 Liquidity Measure, the standardized turnover-adjusted number of zero daily trading volumes over 6 months before and after the 72 sample firms adopted a dual-class (DC) ownership structure. The estimate is

$$LM6 = \left[Number\ of\ \ zero\ daily\ volumes\ in\ 6\ months + \frac{1/(6 - month\ \ turnover)}{Deflator} \right] \times \frac{21 \times 6}{NoTD}.$$

We obtain the before-DC estimate for each sample firm using number of trading days with zero trading volume, the sum of daily turnover over 6 months prior to the announcement month; and the after-DC estimate over 6 months following the ex-DC distribution month. Daily turnover is measured as the ratio of the number of shares traded on a day to the number of shares outstanding at the end of the day. *Deflator* is set at 11,000 such that $0 < \frac{1/(6 - month\ \ turnover)}{Deflator} < 1$ for each stock. *NoTD* is measured as the number of trading days in the market over the 6 months. For each sample firm, we find a matched firm that split its stock within two months either before or after the dual-class firm's stock split with a comparable split ratio (within 0.25 above or below the dual-class firm's split ratio) and that had similar size (i.e., market capitalization) and similar book-to-market ratio.

	After Ex-Distribution Month (Days)	Before Split Announcement Month (Days)	Difference Between After and Before Split (Days)	Paired t-Test (p-value)	Signed-Rank Test (p-value)
Panel A: Superior Voting Stocks					
(1) DC Stocks	17.58	9.69	8.11	4.08*** (0.0001)	571*** (0.0002)
(2) Matched Stocks	6.16	12.16	-5.92	-3.91*** (0.0002)	-582.5*** (0.0003)
Difference, (1)-(2)	11.46	-2.82	14.23	6.02*** (<.0001)	755*** (<.0001)
Paired t-test (p-value)	4.26*** (<.0001)	-0.93 (0.3551)			
Signed-Rank Test (p-value)	685.5*** (<.0001)	17 (0.9164)			
Panel B: Inferior Voting Stocks					
(1) DC Stocks	13.70	9.69	4.32	2.10** (0.0400)	488*** (0.0018)
(2) Matched Stocks	6.16	12.16	-5.92	-3.91*** (0.0002)	-582.5*** (0.0003)
Difference, (1)-(2)	7.64	-2.82	10.44	4.06*** (0.0001)	674*** (<.0001)
Paired t-test (p-value)	3.22*** (0.0020)	-0.93 (0.3551)			
Signed-Rank Test (p-value)	596.5*** (0.0002)	17 (0.9164)			

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level.

Table 7. Liu's *LM12* Surrounding the 72 Dual-Class Splits

This table reports the means of Liu's (2006) *LM12* Liquidity Measure, the standardized turnover-adjusted number of zero daily trading volumes, over 12 months before and after the 72 sample firms adopted a dual-class (DC) ownership structure. The estimate is

$$LM12 = \left[Number\ of\ \ zero\ daily\ volumes\ in\ 12\ months + \frac{1/(12\text{-}month\ \ turnover)}{Deflator} \right] \times \frac{21 \times 12}{NoTD}.$$

We obtain the before-DC estimate for each sample firm using number of trading days with zero trading volume, the sum of daily turnover over 12 months prior to the announcement month; and the after-DC estimate over 12 months following the ex-DC distribution month. Daily turnover is measured as the ratio of the number of shares traded on a day to the number of shares outstanding at the end of the day. *Deflator* is set at 11,000 such that $0 < \frac{1/(12\text{-}month\ \ turnover)}{Deflator} < 1$ for each stock. *NoTD* is measured as the number of trading days in the market over the 12 months. For each sample firm, we find a matched firm that split its stock within two months either before or after the dual-class firm's stock split with a comparable split ratio (within 0.25 above or below the dual-class firm's split ratio) and that had similar size (i.e., market capitalization) and similar book-to-market ratio.

	After Ex-Distribution Month	Before Split Announcement Month	Difference Between After and Before Split	Paired t-Test (p-value)	Signed-Rank Test (p-value)
Panel A: Superior Voting Stocks					
(1) DC Stocks	37.87	20.57	17.35	4.36*** (<.0001)	597*** (<.0001)
(2) Matched Stocks	11.60	24.65	-12.96	-4.36*** (<.0001)	-697.5*** (<.0001)
Difference, (1)-(2)	26.48	-4.76	30.74	6.37*** (<.0001)	787*** (<.0001)
Paired t-test (p-value)	4.74*** (<.0001)	-0.82 (0.4142)			
Signed-Rank Test (p-value)	697.5*** (<.0001)	29 (0.8578)			
Panel B: Inferior Voting Stocks					
(1) DC Stocks	27.16	20.57	7.28	1.74* (0.0861)	430*** (0.0063)
(2) Matched Stocks	11.60	24.65	-12.96	-4.36*** (<.0001)	-697.5*** (<.0001)
Difference, (1)-(2)	15.78	-4.76	20.67	3.91*** (0.0002)	687*** (<.0001)
Paired t-test (p-value)	3.28*** (0.0016)	-0.82 (0.4142)			
Signed-Rank Test (p-value)	610.5*** (0.0001)	29 (0.8578)			

***Significant at the 1% level; **Significant at the 5% level; *Significant at the 10% level.

Table 8 Cross-Sectional Analysis of changes in Liquidity Measures

This table reports the results of regressing changes in liquidity measures from before to after the splits on changes in the price level (Δ Price), changes in turnover (Δ Turnover), changes in number of shareholders (Δ Investor base), changes in the percentage of institutional holdings (Δ Inst. holding), and two dummy variables, with Superior=1 for superior-voting shares of a dual-class split, and Superior=0 otherwise; and Inferior=1 for inferior-voting shares of a dual-class split, and Inferior=0 otherwise. The liquidity measures are Roll's (1984) effective spread (SP), Hasbrouck's (2005) Gibbs estimate of the effective spread (GSP), Amihud's (2002) illiquidity measure (IL), and Liu's (2006) standardized turnover-adjusted number of zero daily trading volumes, LM6 and LM12. The observations in each regression include the dual-class splits and the matched regular splits.

Dep. Variable	model	Explanatory Variable								
		Inter-cept	Superior	Inferior	Δ Price	Δ Turn-over	Δ Investor base	Δ Inst. holding	Adj. R^2	N
Δ SP (%)	1	-0.029 (-0.24)	0.426 (2.51)	0.511 (3.02)					0.038	216
	2	-0.155 (-0.76)	0.332 (1.65)	0.404 (2.04)	-0.323 (-1.42)	-0.0039 (-1.42)	-0.259 (-1.59)	1.073 (1.34)	0.044	193
Δ GSP (%)	3	0.102 (0.87)	0.590 (3.52)	0.509 (3.06)					0.067	178
	4	-0.160 (-0.86)	0.527 (2.88)	0.445 (2.46)	-0.469 (-2.22)	-0.0034 (-1.38)	-0.271 (-1.86)	0.634 (0.91)	0.098	170
Δ IL (10^{-6})	5	-0.240 (-0.17)	3.830 (1.92)	4.143 (2.07)					0.016	203
	6	1.015 (0.44)	2.998 (1.31)	3.556 (1.57)	1.376 (0.53)	-0.0200 (-0.63)	-1.214 (-0.65)	2.960 (0.32)	0.004	193
Δ LM6	7	-5.925 (-3.21)	14.03 (5.33)	10.25 (3.89)					0.124	203
	8	2.091 (0.74)	11.35 (4.07)	9.03 (3.28)	11.54 (3.66)	-0.132 (-3.42)	-2.499 (-1.11)	18.66 (1.68)	0.204	193
Δ LM12	9	-12.96 (-3.50)	30.30 (5.75)	20.24 (3.84)					0.138	203
	10	2.204 (0.39)	23.80 (4.24)	16.63 (3.01)	20.33 (3.20)	-0.271 (-3.48)	-7.145 (-1.57)	40.78 (1.82)	0.207	193