Cleaning House: Stock Reassignments on the NYSE

Amber Anand, Sugato Chakravarty, Chairat Chuwonganant*

Abstract

A frequently occurring, yet unexplored, phenomenon of the New York Stock Exchange specialist system is that of reassignments of stocks by specialist firms on the floor of the Exchange. These events change the portfolios at the individual specialist level by reassigning one or more stocks from one individual specialist to another, and affect a large number of stocks. For instance, we document 240 such events involving 1,087 stocks over our 3-year sample period. We study the possible factors determining stock reassignments, and show the impact of these specialist firm decisions on the market quality and cost of capital of the reassigned stocks. Our results show that reassigned stocks experience a decline in spreads and significant abnormal returns around the event date. These results indicate that listing firms benefit from these reassignments by specialist firms. Our analysis of the factors that determine the probability of a stock being reassigned indicate a prominent role for the industry and size concentration of the individual specialist portfolios in the decision of specialist firms to reassign stocks. Our findings shed light on a hitherto unstudied segment of the market and provide an economic rationale for why the NYSE does not interfere with stock allocations after the initial allocation of new listings among specialists. Possible policy implications of our findings are provided.

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* The authors are from Syracuse University, Syracuse, NY (corresponding author: amanand@syr.edu); Purdue University, West Lafayette, Indiana; and Kansas State University, Manhattan, Kansas, respectively. We are very grateful to Robert Fagenson (CEO, Van Der Moolen Specialists) for conversations that formed the basis of this study, as well as for his comments, and to Paul Bennett (NYSE) for providing the data. We thank Rob Battalio, Craig Holden, Vladimir Gatchev, Robert Jennings, Terry Martell, Stewart Mayhew, Charles Schnitzlein, Chester Spatt, Dan Weaver, and the seminar participants at the AFA 2007 meetings (especially, Shane Corwin, the discussant, for his extensive feedback); Syracuse University; and the University of Central Florida, for discussion and comments. The usual disclaimer applies.

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A frequently occurring, yet unexplored, phenomenon of the New York Stock Exchange specialist system is that of reassignments of stocks by specialist firms on the floor of the Exchange. These events change the portfolios at the individual specialist level by reassigning one or more stocks from one individual specialist to another, and affect a large number of stocks. For instance, we document 240 such events involving 1,087 stocks over our 3-year sample period. We study the possible factors determining stock reassignments, and show the impact of these specialist firm decisions on the market quality and cost of capital of the reassigned stocks. Our results show that reassigned stocks experience a decline in spreads and significant abnormal returns around the event date. These results indicate that listing firms benefit from stock reassignments by specialist firms. Our analysis of the factors that determine the probability of a stock being reassigned indicate a prominent role for the industry and size concentration of the individual specialist portfolios in the decision of specialist firms to reassign stocks. Our findings shed light on a hitherto unstudied segment of the market and provide an economic rationale for why the NYSE does not interfere with stock allocations after the initial allocation of new listings among specialists. Possible policy implications of our findings are provided.

1. Introduction

A frequently occurring, yet unexplored, phenomenon of the New York Stock Exchange (NYSE) specialist system is that of reassignment of stocks by specialist firms on the floor of the Exchange. These events change the portfolios at the individual specialist level by reassigning one or more stocks from one individual specialist to another. We document 240 such events involving 1,087 stocks over a 3-year period. To put this number in perspective, there were 2,783 companies listed on the NYSE at the end of our sample period. We also note that these reassignments by specialist firms stand in stark contrast to the almost total absence of stock reallocations across specialist firms by the NYSE. Thus, even though the NYSE follows an elaborate matching process of new listings with the "right" specialist firms, it rarely reallocates stocks (see, for example, Corwin (1999)).[1]

Given the importance of the specialist system for the liquidity of stocks traded on the NYSE (and increasingly on exchanges around the world), it behooves us to better understand these events. Towards that end, we study the possible factors determining stock reassignments, and show the impact of these specialist firm decisions on the market quality and cost of capital of the reassigned stocks. The specialist system is pervasive in international equities and options markets. For instance, equity markets ranging from the hybrid structure of the NYSE, to completely electronic systems such as those of Euronext, Toronto Stock Exchange, Stockholm Stock Exchange, etc. include a designated market maker. In fact, Charitou and Panayides (2006) note that all major international equity markets, with the exception of the Tokyo Stock Exchange, rely on some form of a designated market maker to facilitate trading. Similarly, all of the US options markets assign each option to a designated market maker. The significance of the specialist system, over time and across markets, is also reflected in the number of academic studies

[1] Such inaction is surprising given the extensive efforts expended on monitoring by the NYSE. For example, the NYSE recently revamped the specialist performance evaluation to include objective measures which "will permit comparisons by stock, panel and post, as well as by firm, and thus will more clearly distinguish between strong and weak performance." (Nancy Reich, VP at the market surveillance unit of NYSE, as quoted in "UPDATE: NYSE seeks to reform specialist allocation, "CNN Money, June 29, 2005.)

devoted to studying various aspects of a specialist.[2] Empirical studies of the specialist system have focused largely on comparing the market quality of securities traded in a specialist system with those traded under an alternative market mechanism, or on specialist trades and inventory management.[3] More recently, attention has been paid to the fact that specialists are employed by large specialist firms, who in turn are responsible for maintaining a "fair" market in their assigned stocks.[4] Thus, specialist firms and their decisions have real consequences for the market quality of the traded securities.

We draw from our conversations with Robert Fagenson, CEO of Van der Moolen Specialists, in conjecturing that stock reassignments by specialist firms are motivated by a need to correct problems associated with the trading of the reassigned stocks. Since the implementation of the new allocation plan by the NYSE in 1997, specialist firms have placed particular emphasis on their relationships with listed firms.[5] Specialist firms increasingly offer a wide array of services to their listed firms, but the promise of superior market quality remains at the core of this relationship.[6] Thus, the market quality of the stock is vital to the relationship of the specialist firm with the listing firm, forcing the specialist firms to monitor market quality measures, and correct any problems. Other factors that could drive stock reassignments include reassignments to match specialist talent to stock characteristics (the Saar (2001) model suggests that a more expert specialist would be better able to resolve investor uncertainty and hence improve

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[2] Glosten (1989) and Benveniste, Marcus and Wilhelm (1992) provide theoretical models where the presence of the specialist mitigates adverse selection. Hasbrouck and Sofianos (1993), Madhavan and Sofianos (1998) and Madhavan and Smidt (1993) provide empirical analyses of specialist profitability and inventory control. Venkataraman (2001), Venkataraman and Waisburd (2005) and Anand and Weaver (2006) provide evidence that a specialist system adds value to the market when compared to an electronic system or a multiple market maker system.

[3] See, for example, Bessembinder and Kaufman (1997), Bessembinder (1999, 2003), Hasbrouck and Sofianos (1993), Madhahvan and Sofianos (1998) and Panayides (2007) among others.

[4] Cao, Choe and Hatheway (1997), Coughenour and Deli (2002) and Corwin (1999) show the influence of specialist firms on market quality. More recent papers have taken a more detailed view of the workings of the specialist system and found that a change in the individual specialist's relationships can impact market quality (Battalio, Ellul and Jennings (2006)), and that the limited attention of an individual specialist (and hence the portfolio composition at the individual specialist level) can have real consequences for trading costs on the NYSE (Corwin and Coughenour (2006)). Hatch, Johnson and Lei (2005) also document the trading differences among stocks in specialist portfolios.

[5] Corwin (2004) provides a detailed analysis of the allocation process on the NYSE.

[6] For instance, on the website for Van Der Moolen Specialists (www.vdm-usa.com), the firm promises, "…our commitment to utilize that capital to maintain high quality markets for the companies we represent."

market quality), and new allocations to the specialist firm necessitating a look at individual specialist portfolios.

In examining the factors that determine specialist portfolio reassignment events, and the impact of these events on the liquidity and cost of capital of the reassigned stocks, our analysis contributes to the literature in three ways: First, we shed light on a critical control mechanism of the NYSE specialist system not previously studied in the literature.[7] Second, we study the market quality and cost of capital implications for the listed firms whose stock is reassigned by the specialist firm. Third, we provide insight into the factors that specialist firms consider in making the decision to reassign some stocks and not others. We note that the factors influencing stock reassignments are likely to be similar to those that influence initial assignments of stocks to individual specialists by specialist firms. Thus, we also shed light on the allocation process *within* specialist firms.

We identify specialist reassignments using three years of post and panel data, from 2000 to 2002, provided by the NYSE. Our analysis of quoted and effective spreads shows that reassigned stocks have higher spreads before reassignments, relative to similar stocks matched on share price, trading volume, volatility and market value of equity. The spreads of the reassigned stocks decline around the reassignment date to a level below that of the matched stocks, but then stabilize to levels very similar to those of the matched stocks' spreads about 10 trading days after the reassignment. These findings imply that reassigned stocks have problems with their liquidity which are corrected by reassignments within specialist firms. An event study analysis around the day of stock reassignments reveals significant abnormal returns associated with these events indicating that listing firms benefit from stock reassignments. We find that an average firm in our sample experiences a 5-day cumulative abnormal return (day 0 to day +4) of 1.22% in excess of a similar sample of control stocks. Given that our average stock has a market value of $5.1 billion, these abnormal returns translate into an increase in value of

[7] We note that Nasdaq market-making firms face the problem of portfolio monitoring at the level of the individual market-maker as well. Ellis, Michaely and O'Hara (2002) point the trend of large market-making firms (categorized as wholesalers) trading thousands of stocks. Our analysis of stock reassignments should be useful in the formation and monitoring of market-maker portfolios for these firms as well.

$62.2 million for the average firm. We use regression analysis to establish that the abnormal returns are significantly related to the decline in spreads, i.e., stocks that experience a higher decline in spreads also show higher 5-day cumulative abnormal returns.

We analyze the factors that determine the probability of a stock being reassigned. Our results indicate a prominent role for the industry and size concentration of the individual specialist portfolios in the decision of specialist firms to reassign stocks. Specifically, we find that portfolios affected by reassignments have significantly lower industry and size concentrations before the reassignments as compared to portfolios which were not affected by the reassignments. These concentrations increase after the reassignment, to levels very similar to that of the unaffected portfolios. The increase in industry concentration indicates a preference for assigning similar stocks to individual specialists (consistent with the models of Caballe and Krishnan (1994) and Strobl (2001)). The increase in size concentration indicates that specialist firms prefer individual specialist portfolios dominated by larger firms. Further, the narrowing of the difference between affected and unaffected portfolios after reassignments suggests that specialist firms pay attention to these measures in the composition of individual specialist portfolios. Overall, our results provide significant evidence of the economic benefits of stock reassignments by specialist firms.

Our plan for the rest of the paper is as follows. The next section presents a discussion of the institutional details, the data and the nature of stock reassignments by specialist firms. Section 3 presents the results on the impact of these events on market quality and returns of reassigned stocks. Section 4 presents an analysis of the determinants of stock reassignments, and section 5 concludes.

2. Institutional details, Data and Methodology

Specialists, on the NYSE, are individuals who facilitate trading in the stocks they are assigned. Thus, they not only match buyers and sellers, but also trade in and out of their personal inventories to ameliorate market volatility during periods of illiquidity. A specialist performs four vital roles - that of auctioneer, catalyst, agent and principal. As an auctioneer, she displays the best bids and offers, and matches buyers with sellers. As a catalyst, she keeps track of the trading interests of different buyers and sellers on the floor of the exchange and continually updates them. As an agent, she acts as the broker for all electronically routed orders to the NYSE floor. Floor brokers can also leave an order with the specialist, freeing themselves up to take on other orders. As a principal, the specialist acts as a major party to a transaction. These roles, combined with the specialists' responsibility to maintain fair and orderly markets, create a significant impact of specialist performance on market liquidity. While the above description applies to individual specialists, over the years, the specialist business has seen significant consolidation. Thus, all specialists in the NYSE are currently employed by seven specialist firms. Each of these firms assigns a portfolio of stocks to a distinct panel. For instance, as of December 31, 2002, LaBranche assigned its stocks among 84 different panels on the NYSE floor, while Spear Leeds had its stocks trading over 70 panels. The reassignments of stocks, within specialist firms, across these panels form the basis of our study.

We use the NYSE post and panel data for a three-year period (2000 to 2002) to construct our sample of stock reassignments by specialist firms. This daily data-set specifies the post and panel a particular stock is traded on. A unique combination of post and panel identifies an individual specialist. Specialist firms periodically reorganize their portfolios by reassigning stocks among individual specialists. A change in the post-panel combination associated with a particular stock helps us identify stock reassignments. There was significant consolidation among specialist firms during our sample period.[8] Hence, we exclude any reassignment events by merging firms that occur within 60 trading days (i.e., day -60 to day +60) of a specialist firm merger, to avoid introducing any confounding effects in our analysis.[9] Further, we find that some of the reassigned stocks in our data are either reassigned back to the original post and panel within a few days, or move again to a different post and panel. These

[8] Hatch and Johnson (2002) analyze specialist firm mergers on the NYSE.

[9] We were sensitive to any reassignments that occur due to a planned or an actual merger. Hence, we applied this filter (of excluding any reassignments within 60 days of the merger) for the announcement dates (where available) as well as the effective dates of the merger.

observations could represent data errors. Another possible explanation for these observations could be a strictly temporary relocation to accommodate an anticipated increase in trading volume (perhaps following an earnings announcement or other significant corporate news). To avoid the confounding effects of data errors, or temporary moves, and to allow an analysis over the window used in this study, we exclude any stock that is reassigned again within six months of the initial reassignment date from our analysis. Additionally, Battalio et. al. (2006) argue that the reassignment of an entire panel of stocks from one location on the floor to another indicates that the specialist moves with the panel as well. Since our focus is on reassignments from one specialist to another, we eliminate all instances where the entire panel of stocks is reassigned.[10]

We restrict our sample to common stocks only; that is, we exclude units, warrants, preferred stocks, and REITS from our analysis since their trading characteristics are likely to differ from those of common stocks. To account for the possibility that specialist reassignments are motivated by certain expected unusual market conditions on a particular day, we exclude stocks with reassignment dates within 5 days of firm mergers (announcement as well as actual dates), share repurchase announcements, and earnings announcements.[11] Furthermore, in case there are some events that affect trading but do not show up in conventional databases, we also delete stocks with unusual spike in volume around the event day. Specifically, a stock is dropped from the sample if the daily trading volume of the stock on any day around the event day (days -5 to +5), is equal to, or higher than, 150% of the average daily trading

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[10] We should also note that some other potential issues might exist with our identification of the stock reassignment sample. Specifically, it appears that, in some instances, the specialist might accompany some stocks to a different panel while leaving other stocks behind. Given our data constraints, we are unable to isolate such cases. However, we do not view this as a serious problem with our analysis, since reassignments can possibly benefit market quality either due to a correction of a mismatch between the specialist and the stock, or due to the creation of a better portfolio traded by the individual specialist. If the specialist moves with some of the stocks she was already trading, the reassigned stocks can still benefit from the change in the portfolio characteristics. Another possibility is that we miss the cases when specialists move across panels but the stocks on each panel are left intact. In all of these cases, we are constrained by the availability of the appropriate data.

[11] The 5 day period is chosen to eliminate the possibility of such corporate events confounding our analysis while still keeping a reasonable sample. The issue is particularly relevant for earnings which are announced every quarter. Hence, picking a long enough window would conceivably cover every trading day. In our tests, we do not find evidence that reassignment dates cluster unusually around earnings announcement dates, and eliminating reassignments within 15 days of an earnings announcement (a 30 day window) does not change any of our conclusions. For non-earnings related corporate events (mergers and share repurchases), we also used longer time windows (60 days) with no qualitative effect on the results.

volume during the benchmark period (days -60 to -40).

We use NYSE trades and quotes (TAQ) data to measure market quality,[12] and CRSP data to calculate abnormal returns. We require our sample stocks to be present in both the TAQ and CRSP databases. We also use Securities Data Company (SDC) data to identify corporate announcements such as mergers, and the I/B/E/S data for earning announcement dates.

Table 1 describes our final sample comprising 1,087 stocks reassigned by 17 firms in 240 distinct reassignment events.[13] We also present the annual breakdown of these reassignment events. Consistent with specialist firm consolidation over the sample period, we find fewer firms reassigning stocks in 2001 and 2002 than in 2000. The maximum number of reassignment events by specialist firms (116 events affecting 472 stocks) occur in 2000, while the minimum occur in 2001 (55 events affecting 323 stocks). These numbers indicate that these reassignments occur frequently, affect a large number of stocks, and are used by all the specialist firms on the NYSE. We also document that these stock reassignments by specialist firms can affect one stock or be a major overhaul of their portfolios, as seen in the wide range of stocks affected by these reassignments (from 1 to 118).

For our analysis focusing on market quality and abnormal returns of the reassigned stocks around the reassignment, we use a period from trading day –60 to trading day +60 (where day 0 is the reassignment date) to isolate any changes in our measures. Our events are distributed over a 3-year period which reduces the chances of any individual market-wide factor confounding our results. However, to further ensure the validity of our results, we use a control sample of stocks not affected by these events. To obtain the control sample, we first calculate the following composite match index for each reassigned

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[12] We eliminate possible data errors by omitting the following trades and quotes in the TAQ database - quotes if either the bid price or the ask price is non-positive; quotes if either the bid size or the ask size is non-positive; quotes if the bid-ask spread is greater than $5 or negative; quotes associated with designated order imbalance or trading halts; quotes and trades if they are out of time sequence, involve an error, or involve a correction; off-trading hours quotes and trades; trades if the price or volume is non-positive; quotes if bid quote, b_t, satisfies $|(b_t - b_{t-1})/b_{t-1}| > 0.10$; quotes if ask quote, a_t, satisfies $|(a_t - a_{t-1})/a_{t-1}| > 0.10$; trades if trade price p_t satisfies, $|(p_t - p_{t-1})/p_{t-1}| > 0.10$.

[13] The same stock can appear more than once in the sample if it is reassigned again by the specialist firm during our three-year sample period, subject to the previously mentioned constraint that the stock is excluded from our sample if it is reassigned within a six month period.

stock in our sample against each NYSE stock that is not subject to reassignment within 60 days before and after the event date:

$$index = \sum_{k=1}^{3} [(Y_k^{REAS} - Y_k^{MTCH})/\{(Y_k^{REAS} + Y_k^{MTCH})/2\}]^2, \quad (1)$$

where Y_k represents share price, trading volume, market value of equity, and volatility; the superscripts, REAS and MTCH, refer to reassigned and matching stocks, respectively; and Σ denotes the summation over the matching criteria used. Then, for each reassigned stock, we select the control stock that has the lowest value of the above index. Table 1, Panel B compares the sample and control stocks. The reassigned and control samples are very similar in their matched characteristics: The average stock in our sample trades 564,361 shares on an average day, at $24.76 per share, and has a market capitalization of $5.1 billion. The average stock in the control sample trades 576,155 shares per day, at $24.92 per share, with a market capitalization of $4.9 billion.[14]

3. Results

3a. Market quality

If stock reassignments by specialist firms lead to more optimal specialist stock portfolios, or better alignment of stock characteristics with the talents of individual specialists, we would expect enhanced liquidity for the affected stocks following the reassignment. Further, if the improvement in liquidity is a result of stock reassignments, we would expect the improvement in market quality for affected stocks to be greater than that for the control sample of stocks. We analyze commonly used measures of market quality – quoted spreads and effective spreads – to conduct our analysis. Quoted spreads measure the ex-ante displayed liquidity available to traders who seek immediacy, while effective spreads measure actual (i.e., ex-post) trading costs incurred by the trader by factoring in trades inside or outside the quoted spread. For each of these measures we calculate a benchmark value computed as an

[14] These summary statistics are calculated over trading days -60 to -40, where day 0 is the event day.

average from day –60 to day –40, where day 0 is the event date. We then measure abnormal levels as the difference between the daily measure and the benchmark period average for each of the days –30 to +60. Quoted spreads (Ask price –Bid price) are time weighted (i.e., weighted by the time the quote is valid for) daily averages, while effective spreads are volume weighted (i.e., weighted by the number of shares in the trade) daily averages.[15]

Table 2, Panel A presents the results for quoted percentage and dollar spreads for our sample and control stocks. The table presents three useful analyses. First, we test whether the quoted percentage and dollar spreads are different between sample and control stocks during the benchmark period (days -60 to -40). Earlier, we proposed that specialist reassignments are a corrective mechanism. Possible symptoms of problems in the trading of certain stocks are spreads being wider than those for other similar stocks traded on the exchange. The comparison during the benchmark period, which is a full two months before the event day (based on approximately 20 trading days in a month) allows us to analyze if this is indeed the case. During the benchmark period, the average quoted percentage spread for our sample stocks is 80.7 basis points, which is 2.9 basis points higher than that for our control sample of stocks (statistically significant at the 1% level). Quoted dollar spreads are higher for the reassigned sample stocks as well.

Next, we document changes in spreads in the period surrounding the event day (days -30 to +60). Our analysis of quoted spreads indicates that spreads are similar to the benchmark period spreads over days -30 to -20, but decline significantly starting at day -10. By day 0, quoted percentage spreads have declined to approximately 74 basis points (compared to approximately 81 basis points in the benchmark period). The second column shows that the difference in abnormal quoted percentage spreads in the sample and control stocks is statistically significant starting with day -5, indicating that the decline in spreads for the reassigned stocks is greater than the decline in matched sample stocks. An interesting aspect of the abnormal spreads results is that the difference between the changes in reassigned and

[15] We calculate the effective spread for stock i at time t as Effective $Spread_{it} = 2D_{it}(P_{it} - M_{it})$, where P_{it} is the transaction price for stock i at time t, M_{it} is the prevailing quote midpoint for stock i at time t, and D_{it} is a binary variable which equals +1 for buyer-initiated trades and -1 for seller-initiated trades. We use the Lee and Ready (1991) algorithm as modified by Bessembinder (2003) to classify a trade as either buyer or seller initiated.

matched stocks peaks around the event day and starts to diminish thereafter. Even so, the decline in spreads is higher on day +60 for reassigned stocks compared to control sample stocks. A comparison of the difference in the level of the spreads (instead of the changes), in the third column, sheds more light on the above mentioned result. We find that, although, around the event day, spreads for reassigned stocks decline to levels lower than those of control stocks, by day +10 the difference between the two samples is no longer statistically significant. Recall that spreads are higher for sample stocks vis-à-vis control stocks over the day -60 to -40 benchmark period. Hence, the picture that emerges from this analysis is that spreads for reassigned stocks are initially higher, but decline significantly, following reassignments, to a new level that is similar to the level of spreads of the stocks in our control sample. These results indicate that reassignments correct the issues with stocks' liquidity by bringing them more in line with similar stocks traded on the exchange.

While quoted spreads are a good measure of ex-ante liquidity, executions frequently occur inside (due to price improvement) or outside the spread (for orders larger than the quoted depth). Effective spreads capture these effects as they compare the execution price to the midpoint of the prevailing bid-ask spread. Table 2, Panel B presents our results for effective percentage and dollar spreads. Results for effective spreads are very similar to those discussed above for quoted spreads. Effective spreads for the reassigned sample stocks are higher than those for control sample stocks in the day -60 to -40 benchmark period. Spreads decline significantly around the event day, dropping below that of matched stocks, but by day +10 stabilize to a level similar to that of matched stocks. This result again shows that reassignments appear to remedy situations where stocks have higher spreads than they should (as determined by the spreads of similar stocks on the exchange).

3b. Cost of capital:

The improvement in market quality and the results of the extant literature, establishing the link between liquidity and firm valuation, imply that we should see an increase in firm value for the reassigned stocks.[16] To test this hypothesis, we calculate the abnormal returns using the market model for our sample and control stocks, using daily data, over days -300 to -40. We then calculate abnormal returns for each stock from days -30 to +60. We also calculate the cumulative abnormal returns after the event day. Consistent with our intuition, we find, from Table 3, that reassigned stocks show a significant abnormal return around the event day. The 5-day (day 0 to day +4) cumulative abnormal return equals 1.37% for reassigned stocks. The difference between the abnormal returns for sample and control stocks is highly statistically significant. Sample stocks have a 5-day CAR, over and above that of control stocks, of 1.22%. This excess 5-day CAR translates into an increase of $62.2 million in market value for the average stock in our sample.[17] The CARs remain statistically significant until day +60. We note that the abnormal returns start to appear around day -10 and are statistically significantly higher than those for the matched sample stocks around day -5. These results are consistent with the decline in spreads that appears strongly around the same time. We attribute the changes before the event day to the release of the news of the impending reassignment to the trading community. The NYSE announces reassignments by specialist firms on its member site (www.nysedata.com). The few announcements that we were able to observe (the NYSE does not maintain an archive of these announcements) tended to be 3 to 7 days before the actual reassignment date. It is conceivable that the trading floor community learns of impending reassignments a few days before the date that such an announcement appears on the website.

3c. Regression analysis

Our results so far show that market quality improves, and the cost of capital declines, following the reassignments of stocks to a different specialist. In this section, we verify that the decline in the cost of capital (as seen by the significant CARs) is related to the improvement in market quality in a multiple regression framework. In addition to including the change in spreads on the right hand side of the

[16] Amihud and Mendelson (1986) and Pastor and Stambaugh (2003) establish the link between stock returns and liquidity. Other studies (such as Amihud, Mendelson and Lauterbach (1997), Kalay, Wei and Wohl (2002) and Venkataraman and Waisburd (2005)) document a positive abnormal return around liquidity enhancing events.

[17] The increase in market value is calculated simply as the 5-day CAR in excess of matched stocks multiplied by the average market value of stocks in the reassigned sample.

regression equation, we also include stock specific characteristics in the regression – the price, volume and market capitalization of the stock as of the event day. Our stock specific variables serve as proxies for firm size and allow for the fact that a change of specialists may have different impact for firms of different size (for example, Neal (1992) shows that specialists benefit small firms more than large firms). Our primary focus in this analysis is to test whether the change in spreads is related to abnormal returns after controlling for any cross-sectional effects. Specifically, we estimate the following equation:

$$CAR_i = \beta_0 + \beta_1\, AVGABQSP_i \text{ (or } AVGABESP_i) + \beta_2\, (1/PRICE_i) + \beta_3 \log(VOL_i) + \beta_4 \log(MVE_i) + \varepsilon_i \qquad (2)$$

where CAR_i is the 5-day cumulative abnormal return from days 0 to +4 for stock i, $AVGABQSP_i$ ($AVGABESP_i$) is the average daily abnormal quoted (effective) \$ spread from days 0 to +4 for stock *i*, representing the change in market quality, $PRICE_i$ is the share price for stock i, VOL_i is the dollar volume for stock *i* on the event day and MVE_i is the market value of equity for stock *i* on the event day.

Table 4 presents the results of the estimation. Our variables of interest, abnormal quoted and effective spreads, both have a negative and significant coefficient implying that the stocks that experience a greater improvement in market quality also experience a higher CAR. This further lends support to our result that the improvement in market quality is associated with a decline in the listed firm's cost of capital.

4. Factors affecting Stock Reassignments

4a. Background

Thus far, we have established that stock reassignments within specialist firms on the NYSE lead to a marked improvement in market quality for the reassigned stocks. The reassigned stocks also experience significant abnormal returns around these reassignments. The clear implication of these findings is that these actions by specialist firms have significant economic consequences for investors and listing firms. We have also shown that reassigned stocks initially have higher spreads than control sample stocks which, after reassignment, decline to the same level as those for the control stocks. Thus, there appears to be some evidence that higher spreads of the (soon to be) reassigned stocks contribute to the reassignments. In this section, we attempt to understand the other factors specialist firms might use in deciding which stocks to reassign.

We draw on the extant literature, and anecdotal evidence, for the possible factors that determine which stocks are reassigned by specialist firms. In this analysis, we focus on observable characteristics of stocks and portfolios (of stocks at a specific panel) affected by these reassignments.[18]

The models of Caballe and Krishnan (CK, 1994) and Strobl (2001) emphasize the role of industry concentration in specialist portfolio formation. In particular, CK provide a model of informed traders trading in multiple, and correlated, risky assets. The authors show that correlated risky assets traded by the same specialist allow for welfare improvement for the market by improving the trading space of both informed and uninformed traders, as well as allowing diversification for the specialist across the various stocks. The diversification for the specialist in this case occurs because order flow for one asset contains information for the other correlated asset. Thus, a specialist who has a complete view of the order flow of similar securities is better able to assess the demand for correlated securities than she would be able to if she could only view the order flow for one of these securities.[19]

Strobl (2001) addresses the question of how securities with correlated payoffs should be optimally allocated to dealers in a specialist system. Using a static (single period) exchange economy with informed and uninformed traders (all agents are risk averse), Strobl shows that specialists always prefer portfolios of highly correlated assets even if handling such portfolios increases their inventory costs resulting from greater payoff uncertainty. Strobl (2001) also finds that specialists and investors can both be better off in situations where stocks with correlated payoffs are assigned to the same specialist. In his

[18] Stocks could conceivably be taken away from a specialist if a mismatch developed between the particular skills of the individual specialist and the emergent characteristics of a stock. We are, however, not able to measure the specialist skill-set in order to be able to comment on this particular reason for stock reassignments.
[19] In a similar vein, Gehrig and Jackson (1998) model competitive specialists in the NYSE and find that, for complementary assets, a single specialist handling both assets will charge a lower spread than competing specialists. Contrarily, with assets that are substitutes, independent ownership is socially beneficial.

model, the benefit of information in trading similar assets is traded off against the cost of lower competition if substitutable assets are traded by the same specialist. In our context, the benefits are even more likely to be higher than the costs since our focus is on the individual specialist portfolio, which typically contains too few stocks to impose any substantive monopoly costs on the market. Strobl (2001) notes that stocks within a single industry are likely to have correlated payoffs. An implication flowing from both the CK and Strobl models is that measures that increase the correlation across risky assets are preferred by specialists and they should also improve market welfare. We draw on these theoretical foundations in testing for whether correlations in asset payoffs (proxied by industry concentration of portfolios) play a role in the formation of individual specialist portfolios, and whether the portfolio changes that result from stock reassignments are associated with changes in market quality of the stocks.

In empirical analyses, Huang and Liu (2004) and Cao, Choe and Hatheway (1997) show that individual specialists subsidize illiquid stocks from their trading in the liquid stocks in their portfolio. Under the assumption that size and liquidity are correlated, the implication of their finding for us is that we should expect to see a mix of large and small stocks assigned to every specialist on the NYSE. Further, Corwin and Coughenour (2005) find that the limited ability of individuals to focus on multiple tasks has adverse consequences for the less active stocks in individual specialist portfolios. They term this the "limited attention" hypothesis. Similarly, Hatch, Johnson and Lei (2005) find that quote adjustments by specialists are faster for stocks that constitute a higher fraction of trading in the individual specialist's portfolio, implying that these higher volume stocks receive more attention from the specialist. Based on these studies, we conjecture that the portfolio composition, with respect to the size of the firms in the portfolio, of the individual specialist is important to the performance of the specialist. Hence, if a stock grows in size and trading activity over time, and demands more of the specialist's attention, we would expect that to have a negative effect on the liquidity of the stock. We, therefore, focus on the size composition of the portfolio as one of the possible reasons for reassigning a stock. While the above discussion is specific to the portfolio of stocks handled by the individual specialist, we also recognize that different stocks will have varying importance to the specialist firms. Harris and Coughenour (2003), for example, assert that the NYSE trades a small number of large stocks and a large number of small stocks. Furthermore, they find that both trading volume and specialist profits are skewed towards the (relatively) few large stocks. In particular, they show that, after decimalization, approximately 82% of specialist profits are earned collectively from their trading in the largest 100 stocks. The next 400 stocks contribute 14.6% of profits while the remaining 1,311 stocks earn only about 3.4% of the profits. Based on these results, we conjecture that specialist firms are likely to pay more attention to the larger stocks than the smaller stocks in their respective portfolios. Hence, within our context, any problems with the primary revenue producing stocks are more likely to be recognized and corrected.

4b. Measures of portfolio and stock characteristics

In the previous sub-section, we hypothesize portfolio industry composition, portfolio size composition, and stock size as possible determinants of stock reassignments by specialist firms across individual specialists. We now present specific empirical measures for these factors.

We measure industry concentration (as a proxy for correlated assets) of an individual specialist portfolio as the sum of squared market value weights of industries in the portfolio, multiplied by 10,000. Specifically,

$$INDCON = \sum_{i=1}^{n} (w_i)^2 \times 10000 \qquad (3)$$

where *INDCON* is the industry concentration index, w_i represents the market-value weight of industry i calculated as the total market value of all stocks in the same industry divided by the total market value of all the stocks in the portfolio.[20] We define an industry by the 2 digit SIC code. Thus, a portfolio with every stock from the same industry would have the highest possible industry concentration measure of 10,000. If having correlated payoffs is beneficial for the specialist, then we would expect industry concentration for portfolios which have stock reassignments to be lower than the industry concentration

[20] This measure draws on the Herfindahl index widely used in the literature.

for the portfolios not affected by these reassignments. Furthermore, subsequent to the reassignments, we would expect the industry concentration to increase for the affected portfolios.

To fully capture the size composition of individual specialist portfolios, we use three different measures. Our primary focus is on a size concentration measure defined to capture the weight of the dominant stocks in the portfolio. The rationale here is that if individual specialist portfolios are created to have one dominant stock and other smaller stocks, then the size concentration of the portfolio would be high. However, multiple large stocks in a portfolio would cause the size concentration measure to decline (e.g., if a stock in the specialist portfolio grows in size). We would then expect the size concentration of portfolios affected by stock reassignments to be lower than those portfolios which the specialist firm leaves untouched. Furthermore, we expect the size concentration to increase after the reassignments. Our measure of size concentration of a portfolio is an index that equals the sum of squared market-value weights of stocks in the portfolio multiplied by 10,000. More formally,

$$SIZECON = \sum_{i=1}^{n} (w_i)^2 \times 10000 \tag{4}$$

where, SIZECON is our size concentration measure, and w_i represents the market-value weight of stock i calculated as the market value of the stock divided by the total market value of all the stocks in the portfolio. A single stock portfolio would give us the highest possible concentration of 10,000. Apart from this measure, we also use the combined market value of all stocks in the portfolio and the number of stocks in the portfolio as size measures. Following the limited attention hypothesis in Corwin and Coughenour (2005), we expect that reassignments are more likely to occur for stocks in larger portfolios (measured by market capitalization of all stocks in the portfolio, and by the number of stocks in the portfolio).

We include the stock groups described in Harris and Coughenour (2003) to account for the varying significance of stocks for the specialist firm. Specifically, they divide their sample into the large stocks (the top 100 stocks by market value), medium size stocks (next 400 stocks) and the remaining sample. Consistent with this classification scheme, we test whether a stock belonging to one of these groupings is more or less likely to be reassigned. As mentioned earlier, since the majority of the specialist firm revenue is generated from the top 100 stocks, we expect the likelihood of reassignment for these stocks to be higher.

4c. Analysis of factors affecting stock reassignments - methodology and results:

We analyze the potential factors driving stock reassignments by specialist firms in three ways. First, we compare the industry and size concentration for the affected portfolios with those of the portfolios not affected by these reassignments, both before and after reassignments. We define unaffected portfolios as those individual specialist portfolios within the *same* specialist firm which are left untouched at the time of the reassignment. We believe that this gives us the best possible control, as the same specialist firm looks at how stocks are assigned among the individual specialists, and decides to change some while leaving others alone. We impose an additional constraint that the unaffected portfolio should remain unchanged in the day -60 to day +60 period corresponding to the reassignment date of the affected portfolios. Second, we analyze the changes in the measures for the affected portfolios following the reassignments. Third, we use a logit regression to study how the factors discussed above affect the probability of a particular portfolio being reorganized.

The results of these comparisons are presented in Table 5. We find that the industry concentration of the portfolios affected by reassignments is significantly lower than the industry concentration for the unaffected portfolios (Panel A). After stock reassignments, the industry concentration of affected portfolios experiences a significant increase (Panel B). Additionally, we no longer see a substantive difference between the industry concentration of portfolios affected by the reassignments and those left unchanged by the specialist firms (Panel C). The results are very similar for our size concentration measure. Before the reassignments, affected portfolios have significantly lower size concentrations than the unaffected portfolios. After the reassignments, the size concentration of the affected portfolios increases significantly to a level that is more comparable to the size concentration of the unaffected portfolios.

Finally, we use the variables discussed above to analyze the decision of the specialist firm to reassign stocks within a logistical regression framework. The particular equation estimated is:

$$REASSIGN = \beta_0 \log(SIZECON) + \beta_1 \log(INDCON) + \beta_2 \log(SIZE) + \beta_3\, DUM100 + \beta_4\, DUM400 + \beta_5 \log(NSTKS) + \varepsilon \quad (5)$$

where *REASSIGN* is a binary variable which equals one for portfolios with reassigned stocks and zero for the unaffected portfolios described above, *SIZECON* is the size concentration index in equation 4, *INDCON* is the industry concentration index in equation 3, *SIZE* is the total market value of equity for the portfolio, *DUM100* is a binary variable which equals one for the 100 largest NYSE stocks and zero otherwise, *DUM400* is a binary variable which equals one for the next 400 stocks and zero otherwise and *NSTKS* are the number of stocks in the portfolio. The regression includes the portfolio and stock characteristics discussed earlier.

We present the estimation results in Table 6. The coefficients indicate the impact of the independent variables on the likelihood of stock reassignments. Our estimates indicate a significant role for almost all of our independent variables in specialist firm decision-making. The signs are also in the expected directions. For example, the size concentration coefficient of -0.66 and the industry concentration coefficient of -1.17, both significant at the 1% level, indicate that a lower size or industry concentration of the portfolio increases the likelihood of the stocks in that portfolio being reassigned. Similarly, larger (in market value as well as number of stocks) portfolios are more likely to have stocks reassigned than smaller portfolios. We also find that the size of the reassigned stock plays a role in this decision. Consistent with our expectations of specialist firms paying more attention to their most profitable stocks, the 100 largest NYSE stocks are the most likely to be reassigned. The next 400 stocks do not show any significant differences from the remaining stocks in their probability of reassignment.

In sum, our results show that the industry concentration and size characteristics of individual specialist portfolios play a significant role in the specialist firms' decision to reassign stocks across individual specialists. Further, the results in Table 5 also indicate that the specialist firms appear to have some decision making rules which cause the industry and size concentration levels of portfolios affected by reassignments to resemble those of unaffected portfolios. In our knowledge, this is the first piece of empirical evidence in the literature on the factors that specialist firms take into account in assigning stocks across panels. We leave the question of whether these decision rules stay constant over time, or shift in response to market changes, to future research. We also contend that understanding the factors motivating reassignments takes us a step further in understanding how specialist firms assign stocks to individual specialist portfolios in the first place.

We analyze whether the changes in industry and size concentration are related to the improvement in liquidity for the reassigned stocks. Specifically, we estimate the following regression model:

$$AVGABQSP_i \text{ (or } AVGABESP_i\text{)} = \beta_0 + \beta_1 \Delta PORTCON + \beta_2 \log(PRICE) + \beta_3 \log(VOL) + \beta_4 \log(MVE) + \varepsilon \quad (6)$$

where $AVGABQSP_i$ (or $AVGABESP_i$) is the average daily abnormal quoted dollar spread, or the average daily abnormal effective dollar spread, from days 0 to +4, $\Delta PORTCON$ is either the change in industry concentration or the change in size concentration, *PRICE* is the share price, *VOL* is the dollar volume, and *MVE* is the market value of equity. As discussed earlier, if increasing industry and size concentration play into specialist firm decisions to reconfigure portfolios, and these changes improve market quality, then we should see a significant inverse relation between the change in industry (or size concentration) and the improvement in market quality. The results in Table 7 provide strong support for our hypothesis. The coefficients on the change in concentration measure are negative and statistically significant at the 1% level.[21]

[21] We do not include changes in industry and size concentration in the same regression model, since changes to portfolios are likely to cause the two measures to change simultaneously and hence be highly correlated, introducing multicollinearity into the regression. Empirically, we find this to be the case.

5. Conclusion

In this study, we explore the periodic reorganizations of individual specialists' portfolios by specialist firms operating in the NYSE. The analysis of this practice also explains why the NYSE almost never reallocates stocks across specialist firms (after their initial allocation), instead letting the firms correct any temporal mismatches in-house. Our study is the first to investigate these frequently occurring events and to document their economic implications.

Using recently available post and panel level data from the NYSE over a 3-year period, we report a significant improvement in market quality of the reassigned stocks. Significantly, this improvement in market quality is associated with a lower cost of capital for the listed firms as seen by the abnormal returns surrounding these events. For example, we find that an average firm in our sample experiences a 5-day cumulative abnormal return (day 0 to day +4) of 1.22% in excess of a similar sample of control stocks. Given that our average stock has a market value of $5.1 billion, these abnormal returns translate into an increase in value of $62.2 million for the average firm. Thus, our results indicate an alignment between the interests of the specialist firms, issuing firms and the investors since, following stock reassignments, liquidity improves, and cost of capital of the issuing firm declines.

We further identify the observable factors that determine the likelihood of stocks in a particular individual specialist portfolio being reassigned. We find that size and industry concentration of individual specialist portfolios are significant determinants of the likelihood of a portfolio being affected by a reassignment event. The overall size of the portfolio, and the revenue generating potential of a stock, also impacts the specialist firms' decision to reassign stocks across panels.

We note that we do not comment on the optimality of stock reassignments in the current study. Thus, our focus is on understanding the role of stock reassignments in a specialist system and the various associated effects, and not on whether such reassignments indicate sub-optimal initial assignments, or on whether these reassignments should occur sooner or later than they do. We believe we present a comprehensive analysis of an often used control mechanism by specialist firms on the largest exchange in the world, and leave the above mentioned questions to future research.

Overall, our analysis sheds light on the economic benefits of reassignments by specialist firms. We show that such reassignments are meant as a significant corrective mechanisms and are not random (i.e., cosmetic) redistribution of stocks among available specialists within a firm. Our findings also underscore the value added by the specialists to their market making in specific stocks and, ultimately, to the underlying firm.

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Table 1: Descriptive statistics

This table summarizes the sample used in the study. We use the daily NYSE post and panel data for a three-year period (2000 to 2002) to construct our sample of stock reassignments. This daily data-set specifies the post and panel a particular stock is traded on. A unique combination of post and panel identifies an individual specialist. We restrict our sample to common stocks only. Panel A provides the number and frequency of specialist firm reassignments, Panel B presents summary statistics of reassigned stocks and matched stocks. For each reassigned stock, we pick an NYSE stock as the matched stock that is not reassigned with 60 trading days before and after the date of reassignment and minimizes the following index:

$$index = \sum_{k=1}^{4} [(Y_k^{REAS} - Y_k^{MTCH})/\{(Y_k^{REAS} + Y_k^{MTCH})/2\}]^2$$

where Y_k represents share price, trading volume, market value of equity, and volatility. The superscripts, REAS and MTCH, refer to reassigned and matching stocks, respectively.

Panel A. Specialist firm reassignment events

	2000	2001	2002	Overall
Number of reassignment events	116	55	69	240
Number of specialist firms affected	17	7	8	17
Average number of stocks per event	4.07	5.88	4.23	4.53
Total number of reassigned stocks	472	323	292	1,087
Minimum number of stocks per event	1	1	1	1
Maximum number of stocks per event	118	93	41	118

Panel B. Reassigned and matched stocks

	Reassigned sample			Matched sample		
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
Price ($)	24.76	19.52	21.53	24.92	19.21	19.09
Volume (shares)	564,361	123,174	1,517,636	576,115	122,019	1,515,033
Market value of equity ($ M)	5,101	683	24,427	4,945	709	19.380
Volatility	0.0251	0.0231	0.0192	0.0255	0.0217	0.0194

Table 2: Spreads

This table summarizes changes in quoted percentage and dollar spreads, and effective percentage and dollar spreads around the day of stock reassignments. There are three columns for each measure: the first column presents the measure for the day -60 to -40 benchmark period, and the measure over days -30 to +60; the second column presents the difference in the changes (relative to the benchmark period) in the measure for sample and matched stocks; and the third column presents the difference in the measure for sample and matched stocks. The abnormal spread is calculated as $(SP_{EVT} - SP_{NORM}) / SP_{NORM}$, where SP_{NORM} is the average spread over days –60 to–40, and SP_{EVT} Is the spread as of a particular day around the event date. Panel A shows the results for quoted percentage and quoted dollar spreads. Panel B reports the results for effective percentage and effective dollar spreads. We calculate the effective spread for stock i at time t as Effective $Spread_{it} = 2D_{it}(P_{it} - M_{it})$, where P_{it} is the transaction price for stock i at time t, M_{it} is the prevailing quote midpoint for stock i at time t, and D_{it} is a binary variable which equals +1 for buyer-initiated trades and -1 for seller-initiated trades. Trades are classified as buys or sells using the Lee and Ready (1991) algorithm as modified by Bessembinder (2003). Effective spreads are volume weighted daily averages.

Panel A. Quoted spreads

Day	Quoted % Spread	Difference in Abnormal Quoted % Spread (Reassigned – Matched)	Difference in Quoted % Spread (Reassigned – Matched)		Quoted $ Spread	Difference in Abnormal Quoted $ Spread (Reassigned – Matched)	Difference in Quoted $ Spread (Reassigned – Matched)
-60 to -40	0.8074%		0.0292%**		$0.1214		$0.0091**
-30	0.8176	3.45%**	0.0304%**		0.1199	2.39%*	$0.0116**
-20	0.8190	2.37	0.0195*		0.1242	0.97	0.0115**
-10	0.7633**	-4.20**	0.0163		0.1168**	-4.43**	0.0025
-5	0.7519**	-7.16**	-0.0422*		0.1104**	-10.34**	-0.0041*
-4	0.7422**	-8.84**	-0.0455*		0.1099**	-12.08**	-0.0054*
-3	0.7424**	-9.35**	-0.0553**		0.1114**	-12.58**	-0.0063**
-2	0.7360**	-11.68**	-0.0979**		0.1104**	-15.07**	-0.0095**
-1	0.7424**	-10.08**	-0.0629**		0.1094**	-13.35**	-0.0067**
0	0.7439**	-13.28**	-0.0813**		0.1105**	-13.26**	-0.0070**
1	0.7298**	-12.66**	-0.0771**		0.1098**	-12.30**	-0.0065**
2	0.7467**	-12.77**	-0.0693**		0.1110**	-12.58**	-0.0060**
3	0.7427**	-12.93**	-0.0635**		0.1106**	-12.46**	-0.0066**
4	0.7206**	-10.67**	-0.0737**		0.1092**	-9.95**	-0.0046*
5	0.7174**	-9.74**	-0.0534**		0.1080**	-8.78**	-0.0034*
10	0.7311**	-7.56**	-0.0343		0.1106**	-8.21**	-0.0014
20	0.6830**	-9.88**	-0.0217		0.1070**	-8.38**	-0.0012
30	0.6999**	-6.34**	-0.0161		0.1074**	-5.56**	0.0025
40	0.6665**	-8.87**	0.0148		0.1000**	-7.44**	-0.0008
50	0.6646**	-7.33**	-0.0021		0.0995**	-6.04**	0.0010
60	0.6254**	-10.09**	-0.0116		0.0952**	-7.46**	-0.0009

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

Panel B. Effective spreads

Day	Effective % Spread	Difference in Abnormal Effective % Spread (Reassigned – Matched)	Difference in Effective % Spread (Reassigned – Matched)		Effective $ Spread	Difference in Abnormal Effective $ Spread (Reassigned – Matched)	Difference in Effective $ Spread (Reassigned – Matched)
-60 to -40	0.6268%		0.0278%**		$0.0933		$0.0072**
-30	0.6202%	3.84%**	0.0287%**		0.0927	3.79%**	$0.0095**
-20	0.6327	3.55**	0.0270*		0.0942	3.19*	0.0102**
-10	0.5921**	-2.87*	0.0153		0.0899*	-3.23*	0.0041*
-5	0.5725**	-6.90**	-0.0309*		0.0840**	-10.09**	-0.0023*
-4	0.5539**	-9.86**	-0.0594**		0.0827**	-12.63**	-0.0049**
-3	0.5686**	-9.20**	-0.0452**		0.0857**	-10.29**	-0.0034*
-2	0.5700**	-9.44**	-0.0546**		0.0851**	-12.35**	-0.0042**
-1	0.5589**	-10.32**	-0.0570**		0.0826**	-13.18**	-0.0056**
0	0.5780**	-14.19**	-0.0531**		0.0859**	-11.96**	-0.0042**
1	0.5611**	-13.10**	-0.0645**		0.0839**	-11.49**	-0.0039*
2	0.5649**	-14.11**	-0.0563**		0.0826**	-12.70**	-0.0050**
3	0.5600**	-14.98**	-0.0567**		0.0826**	-13.10**	-0.0053**
4	0.5517**	-13.18**	-0.0626**		0.0828**	-10.89**	-0.0032*
5	0.5613**	-11.27**	-0.0427**		0.0833**	-8.61**	-0.0021*
10	0.5567**	-7.47**	-0.0136		0.0839**	-6.71**	0.0010
20	0.5341**	-10.49**	-0.0200		0.0813**	-7.65**	0.0005
30	0.5271**	-8.29**	-0.0249		0.0796**	-6.22**	0.0009
40	0.4963**	-10.66**	-0.0088		0.0728**	-8.11**	0.0013
50	0.4896**	-8.66**	-0.0162		0.0733**	-6.14**	0.0014
60	0.4675**	-10.94**	-0.0114		0.0706**	-6.70**	-0.0001

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

Table 3: Abnormal returns

This table summarizes abnormal returns around stock reassignments by specialist firms. We calculate abnormal returns using the market model for our sample and control stocks. Our estimation period for the market model parameter is from day -300 to day -40. Results are presented for reassigned and matched stocks. We also calculate the paired difference between the reassigned stock sample and the matched sample.

Day	Abnormal returns	Difference in abnormal returns (Reassigned – Matched)
-30	0.03%	-0.20%
-20	-0.01	-0.15
-10	0.08*	0.05
-5	0.20**	0.10*
-4	0.12*	0.09*
-3	0.10*	0.15*
-2	0.26**	0.15*
-1	0.09*	0.08*
0	0.40**	0.27**
1	0.25**	0.34**
2	0.26**	0.18*
3	0.19**	0.16*
4	0.27**	0.27**
5	0.16**	-0.06
10	0.07	0.05
20	-0.08	0.04
30	-0.09	-0.06
40	0.06	0.04
50	0.01	0.07
60	0.07	0.06
0 to 4	1.37**	1.22**
0 to 60	3.04**	1.74**

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

Table 4: Regression analysis: Abnormal returns and spreads

This table relates 5-day (day 0 to day +4, where day 0 is the event day) cumulative abnormal returns around stock reassignments by specialist firms to changes in spreads. We calculate abnormal returns using the market model for our sample and control stocks. Our estimation period for the market model parameter is from day -300 to day -40. The 5-day cumulative abnormal return from days 0 to +4 is computed by adding abnormal returns over the 5-day period. The regression equation estimated is:

CUMABR = $\beta_0 + \beta_1$ *AVGABQ$SP* (or *AVGABQ%SP* or *AVGABE$SP* or *AVGABE%SP*) + β_2 (*1 / PRICE*) + β_3 *log(VOL)* + β_4 *log(MVE)* + ε;

where CUMABR is the cumulative abnormal returns from days 0 to +4 for the stock , AVGABQ$SP (AVGABQ%SP) is the average daily abnormal quoted dollar (percentage) spread from days 0 to +4 for the stock, AVGABE$SP (AVGABE%SP) is the average daily abnormal dollar (percentage) effective spread from days 0 to +4 for the stock, PRICE is the share price for the stock, VOL is the dollar volume for the stock and MVE is the market value of equity for the stock. Price, dollar volume and market value of equity are as of the event day.

	Results based on quoted spreads		Results based on effective spreads	
	CUMABR	CUMABR	CUMABR	CUMABR
Intercept	-0.0008 (-0.06)	-0.0024 (-0.18)	-0.0019 (-0.14)	-0.0038 (-0.29)
AVGABQ$SP	-0.0203** (-3.27)			
AVGABQ%SP		-0.0136** (-2.93)		
AVGABE$SP			-0.0223** (-3.68)	
AVGABE%SP				-0.0151** (-3.85)
1 / PRICE	0.0306** (2.72)	0.0374** (3.28)	0.0313** (2.78)	0.0408** (3.54)
log(VOL)	0.0056** (4.12)	0.0059** (4.34)	0.0055** (4.07)	0.0058** (4.32)
log(MVE)	-0.0052** (-2.82)	-0.0053** (-2.91)	-0.0050** (-2.75)	-0.0052** (-2.87)

*Significant at the 5 percent level.
**Significant at the 1 percent level.
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Table 5

This table presents the size and industry concentration for the portfolios with reassigned stocks. We consider both the portfolio from which the stock is reassigned and the portfolio to which the stock moves as portfolios affected by the reassignment. We also benchmark these measures with the portfolios that are unaffected by these reassignment events. We define unaffected portfolios as all those individual specialist portfolios in the same specialist firm which are left untouched at the time of the reassignment, and are not affected by a reassignment event within (before or after) a month of the event date. Size and industry concentration indices are calculated as follows. For each portfolio we calculate the following index.

$$\sum_{i=1}^{n} (w_i)^2 X10000$$

where w_i represents the market-value weight of stock i calculated as the market value of the stock divided by the total market value of all the stocks in the portfolio when measuring size concentration, and the total market value of all stocks in the same industry divided by the total market value of all stocks in the entire portfolio when measuring the industry concentration index. Panel A presents the size and industry concentration indices before reassignments by specialist firms for affected and unaffected portfolios, and tests for equality of means of indices of affected and unaffected portfolios. Panel B presents the results after the reassignments. Panel C compares the indices for the affected portfolios before and after the reassignments. Numbers in parentheses are t-statistics.

Panel A: Before reassignment

	Reassigned Portfolio	Unaffected Portfolio	Reassigned – Unaffected
Avg. size concentration Index	3,970	4,567	-597** (-4.46)
Avg. industry concentration Index	5,544	6,235	-691** (-5.15)

Panel B: Before and after reassignment comparison

	Before Reassignment	After Reassignment	Before – After
Avg. size concentration Index	3,970	4,409	-439** (-2.96)
Avg. industry concentration Index	5,544	5,946	-402** (-3.05)

Panel C: After reassignment

	Affected Portfolio	Unaffected Portfolio	Affected – Unaffected
Avg. size concentration Index	4,409	4,473	-64 (-0.47)
Avg. industry concentration Index	5,946	6,031	-85 (-0.74)

**Significant at the 1% level.

Table 6
This table presents the estimates of a logistical regression of the form:

$$REASSIGN = \beta_0 + \beta_1 \log(SIZECON) + \beta_2 \log(INDCON) + \beta_3 \log(SIZE) + \beta_4 DUM100 + \beta_5 DUM400 + \beta_6 \log(NSTKS) + \varepsilon$$

where *REASSIGN* is a binary variable which equals one for portfolios with reassigned stocks and zero for the unaffected portfolios, *SIZECON* is the size concentration index in equation 2, *INDCON* is the industry concentration index in equation 3, *SIZE* is the total market value of equity for the portfolio, *DUM100* is a binary variable which equals one for the top 100 stocks and zero otherwise, *DUM400* is a binary variable which equals one for the next 400 stocks and zero otherwise and *NSTKS* are the number of stocks in the portfolio. Numbers in parentheses are t-statistics.

	REASSIGN
Intercept	-7.8015** (-13.10)
SIZECON/10000	-0.6603** (-3.49)
INDCON/10000	-1.1694** (-7.34)
log(SIZE)	0.2438** (6.45)
DUM100	0.1902** (2.82)
DUM400	-0.1034 (-1.13)
log(NSTKS)	0.4942** (8.29)

**Significant at the 1% level.

Table 7
This table reports the results of the following regression:

AVGABQ$SP or AVGABQ%SP or AVGABE$SP or AVGABE%SP $= \beta_0 + \beta_1\, \Delta$SIZECON (or ΔINDCON) $+ \beta_2 \log(\text{PRICE}) + \beta_3 \log(\text{VOL}) + \beta_4 \log(\text{MVE}) + \varepsilon$;

where AVGABQ$SP (AVGABQ%SP) is the average daily abnormal quoted dollar (percentage) spread from days 0 to +4, AVGABE$SP (AVGABE%SP) is the average daily abnormal effective dollar (percentage) spread from days 0 to +4, PRICE is the share price, VOL is the dollar volume, and MVE is the market value of equity. Numbers in parentheses are t-statistics.

	AVGABQ$SP	AVGABQ%SP	AVGABE$SP	AVGABE%SP	AVGABQ$SP	AVGABQ%SP	AVGABE$SP	AVGABE%SP
Intercept	-0.0316**	-0.0055**	-0.0424**	-0.0057**	-0.0305**	-0.0054**	-0.0417**	-0.0056**
	(-3.93)	(-6.32)	(-6.63)	(-6.20)	(-3.78)	(-6.21)	(-6.50)	(-6.11)
Δ(SIZECON/10000)	-0.0265**	-0.0019**	-0.0177**	-0.0016**				
	(-4.31)	(-2.99)	(-3.62)	(-2.95)				
Δ(INDCON/10000)					-0.0234**	-0.0020**	-0.0184**	-0.0015**
					(-3.82)	(-2.85)	(-3.96)	(-2.84)
log(PRICE)	-0.0001	0.0008**	-0.0025	0.0009**	-0.0001	0.0008**	-0.0025	0.0009**
	(-0.05)	(4.41)	(-1.57)	(5.87)	(-0.05)	(4.35)	(-1.56)	(5.84)
log(VOL)	0.0001	0.0001	0.0004	0.0001	0.0001	0.0001	0.0003	0.0001
	(0.04)	(0.64)	(0.47)	(0.68)	(0.04)	(0.60)	(0.41)	(0.65)
log(MVE)	0.0012	0.0001	0.0022	0.0001	0.0013	0.0001	0.0023	0.0002
	(0.91)	(0.43)	(1.13)	(0.73)	(0.94)	(0.44)	(1.16)	(0.74)

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