STOCK LISTING CHANGES: TIMING OR SIGNALING

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ABSTRACT

We develop predictions based, respectively, on the timing and signaling hypotheses regarding stock listing changes. We suggest that the timing hypothesis implies the presence of unfavorable private information whereas, conversely, the signaling hypothesis implies the presence of favorable information. Focusing on the post-listing operating performance of listing firms, we find strong evidence in favor of the timing hypothesis. We find no evidence to support the versions of signaling based on improved visibility and greater information production due to listing. Less well-known firms do not enjoy the greater performance gains (relative to well-known firms) implied by these expected benefits from listing. There is evidence, however, that post-listing performance is conditioned on the continued listing standards. Firms with weak pre-listing performance do better compared to other listing firms after listing. We conclude that such firms condition their listing decision on both, an unusually strong performance and positive private information about their ability to satisfy the ongoing listing requirements on the new market.
STOCK LISTING CHANGES: TIMING OR SIGNALING

A considerable body of research on exchange listings has identified three main reasons that motivate many firms to seek listing of their stocks on a new trading venue. These three reasons are: the potential for a reduction of marketability costs; improvement in visibility and investor base; and the signaling of favorable future performance.

Christie and Huang (1994), Kadlec and McConnell (1994) and Elyasiani, Hauser and Lauterbach (2000) report evidence of reduced liquidity costs (bid-ask spreads) when Nasdaq and American Stock Exchange (AMEX) stocks list on the New York Stock Exchange (NYSE), whereas Grammatikos and Papaioannou (1986a), Kadlec and McConnell (1994) and Elyasiani, Hauser and Lauterbach (2000) document positive market reaction to the expected reduction of liquidity costs. Kadlec and McConnell (1994), Baker and Johnson (1990), Baker, Powell and Weaver (1999a, 1999b), Baker, Nofsinger and Weaver (2002) and Foerster and Karolyi (1999) report significant gains in the number of shareholders and visibility when domestic and international stocks are listed on another market in the U.S. Consistent with Merton’s (1987) investor recognition model, these gains in investor awareness lead to positive revaluation of the listing firms. Finally, the conjecture in Ying et al. (1977) and Sanger and McConnell (1986) that listing on a market with more rigorous standards can serve as a credible signal of managerial confidence is empirically tested and supported in Grammatikos and Papaioannou (1986b).

Further research in the performance of newly listed stocks has shown, however, that the positive market reaction up to the time of listing is followed by negative market price performance after listing (Ying et al. (1977) and McConnell and Sanger (1987)). More recently, Dharan and Ikenberry (1995) and Webb (1999) report evidence of negative excess returns over medium and long investment horizons following listing. Papaioannou, Travlos and Viswanathan (2002) find that certain groups of stocks that list on another marketplace also display inferior operating performance compared to benchmark groups of firms. As Dharan and Ikenberry observe, their evidence, as well as that in Webb (1999) and Papaioannou, Travlos and Viswanathan (2002), suggests that managers self-select the timing of the listing decision to coincide with a period of unusually strong performance. Smaller and less followed firms are
more likely to choose to list while they meet the initial listing standards of another stricter trading venue. These firms are more likely to satisfy the initial standards only over transitory periods and thus they have a stronger reason to list before their performance deteriorates. Consequently, it is more likely that such firms will experience inferior stock price as well as operating performance after listing.

Although most research attention has been focused on the timing hypothesis, there is sufficient evidence and theory to develop a signaling theory of listing. We build on the respective hypotheses in favor of timing and signaling to derive testable predictions about the post-listing operating performance of firms that move from one trading venue to another. Specifically, we recognize that the timing hypothesis implies that managers have unfavorable private information about the firm’s future prospects. Therefore, they choose to list on another market while the firm still satisfies the initial listing standards of the new venue. On the contrary, the signaling hypothesis implies that managers have favorable private information about the firm’s prospects. Hence, they choose to list in order to induce a positive market revaluation of the firm. Well-known firms have no incentive to exploit systematically timing or signaling as a motive for listing. Investors share the same information about the firm that insiders have. Therefore, listing has no value as a signal. Well-known firms are also larger firms with the type of characteristics that can satisfy the listing standards of another marketplace on a more sustainable basis. Hence, timing of listing is less critical to these firms. On the other hand, less well-known firms with positive private information have stronger reason to separate themselves from other similar firms of inferior quality. They can use a listing switch to obtain a positive revaluation thus signaling their positive private information. Less well-known firms are more representative, however, of the type of firms which may only occasionally satisfy high listing standards. Hence, they have a motive to select the time of listing before their performance deteriorates.

Based on this analysis, we draw two general predictions for the timing and signaling hypotheses, respectively. The timing hypothesis predicts inferior post-listing operating performance for less well-known firms. The signaling hypothesis predicts superior post-listing operating performance for less well-known firms. We use these predictions to perform more detailed tests of the two competing hypotheses.
Overall, the results provide evidence in favor of the timing hypothesis. Firms list after a period of strong performance. Most of them, but primarily the small and less well-followed Nasdaq firms that list on the AMEX, fail to sustain the pre-listing performance. Most important, is the lack of evidence that less well-known firms exhibit the relatively stronger post-listing performance predicted by gains in visibility or increased information production due to listing. Nonetheless, an important finding of this study is that firms with weak pre-listing performance perform comparatively better than other types of firms. This supports the version of signaling theory that conditions post-listing performance on the continued listing standards.

The study is important for several reasons. First, it is the first study that systematically draws the signaling implications of various motives of stock listing in relation to the operating performance of the firm. Second, it produces evidence that enhances our understanding of the importance of continued listing requirements for firm performance, especially for those firms with weak pre-listing performance. Finally, it provides additional support to the proposition that the timing of various corporate decisions coincides with particular patterns of firm performance that may create a more favorable market receptivity.

The next section builds on previous research to develop the hypotheses and their testable predictions. Section 2 describes the data and methodology. Section 3 presents and interprets the findings; and section 4 concludes with a summary and the implications of the study.

I. Previous Research and Testable Predictions

A. The timing hypothesis

Previous research has shown that various types of corporate decisions seem to be made when managers believe that their firms appear to be either overvalued or undervalued by the market. Such studies include Loughran and Ritter (1995 and 1997) for initial public offerings (IPOs) and seasoned equity offerings (SEO); Spiess and Affleck-Graves (1999) for debt offerings; Ikenberry, Lakonishok and Vermaelen (1995) and D’Mello and Shroff (2000) for stock repurchases; and Ikenberry and Ramnath (2002) for stock splits.

Along a similar vein, Dharan and Ikenberry (1995) present evidence that the decision of firms to list on another marketplace is consistent with opportunistic timing of decisions by managers. Specifically, they find that after 1973 Nasdaq to NYSE and Nasdaq to AMEX listers
realize negative excess returns for periods up to three years after their listing. The negative return performance persists for the Nasdaq to AMEX sample even after removing firms with an IPO or SEO prior to or after the listing time. Furthermore, firms with larger equity capitalization and higher institutional holdings experience better return performance than smaller firms with lower institutional holdings. The size and institutional ownership related results explain the inferior return performance of the Nasdaq firms that moved their stocks to the AMEX. These are usually very small firms and have relatively low institutional stock holdings. Thus, Dharan and Ikenberry conclude that small and less-well known firms seem to engage in opportunistic timing of their listing decision.

Webb (1999) also reports that listing stocks experience worse post-listing stock return performance than non-listing stocks. Most important is the finding that stocks with the best pre-listing return performance tend to have the worst post-listing return performance. She interprets these findings as evidence that managers initiate listing changes following periods of strong firm performance. Tandon and Webb (2001) focus on trading volume changes around the listing time and post-listing stock return performance. They find that stocks with high pre-listing trading activity exhibit inferior (relative to control samples) returns after listing. This inverse relationship is stronger for Nasdaq-to-AMEX listers but weak for AMEX-to-NYSE and not present for Nasdaq-to-NYSE listers. They infer that firms switch their listing during periods of strong market interest in these firms, which they attribute to possible over-optimism about the firms’ prospects.

After controlling for mean-reversion and industry effects, Papaioannou, Travlos and Viswanathan (2002) provide evidence of inferior operating performance (measured as operating return on assets and operating return on sales) in the post-listing period which is concentrated mostly in the small and low institutional ownership Nasdaq-to-AMEX stocks. There is also evidence that firms tend to list following a period of significant improvement in operating performance.

If a firm’s managers opportunistically select the time to switch its stock’s listing to another market, they must believe that the firm is not likely to satisfy the initial standards of the new trading venue in the foreseeable future. Therefore, under the timing hypothesis, the listing time must, in general, be preceded by strong performance followed by inferior performance.
Well-known firms are less likely to engage systematically in self-selection of their listing decision. These are usually relatively large and well-established firms and as such are more likely to satisfy the initial listing standards of the new exchange on a sustainable basis. Consequently, the pattern of deteriorating performance in relation to the pre-listing period should not be observed systematically for these firms. Less well-known firms, however, are more likely to be smaller, less well-established firms. These firms may not be able to sustain a level of performance that will meet the initial standards for listing over an extended period of time. Therefore, they are more likely to initiate a listing change while their performance is at a high level. One can expect to observe with greater frequency such firms to experience an erosion of their temporarily strong performance in the post-listing period. Opportunistic timing of the listing decision by less well-known firms is consistent with the presence of unfavorable private information shared by the firm’s insiders.

The timing hypothesis implies, therefore, the following predictions:

**Prediction 1:** Less well-known firms that switch their stock listings will realize inferior post-listing operating performance. Well-known firms that switch their stock listings will realize neutral post-listing operating performance.

**B. The signaling hypothesis**

A signaling theory of the listing decision can be developed from several different strands of conjecture and evidence found in previous research. For example, Ying et al. (1977) state “[T]he listing application provides the final credible signal to investors that the firm has “arrived” as an established concern, and they react enthusiastically thereto.” Sanger and McConnell (1986) echo the above conjecture in writing “managers who feel that their firm’s stock is currently undervalued may obtain a listing to attract increased scrutiny by the market.”

Based on survey-generated data, Baker and Johnson (1990) report that managers list improved visibility through listing as an important motive to move the trading of their stock on a more visible and established exchange. Consistent with this view, Baker, Powell and Weaver (1999a) find significant increases in visibility proxies like number of institutions and shares held by institutions for stocks that move from the Nasdaq to the AMEX. In similar research, Baker, Powell and Weaver (1999b) report visibility gains for Nasdaq firms moving to the NYSE,
although the gains seem to be attributed rather to positive changes in equity market value than to the change in trading venue.\textsuperscript{1} Although visibility has been used to test Merton’s (1987) theory of investor recognition, additional publicity and interest in the firm resulting from listing has implications from a signaling point of view.\textsuperscript{2}

A less well-known firm with private information that its performance is about to improve in the future has an incentive to be traded in a market where it receives more attention and scrutiny by investors. This helps the firm to realize a more positive revaluation once its operating performance improves. In essence, the listing on the more visible market enables the firm to separate itself from poor quality firms traded in its original market. Other less well-known firms with poor quality prospects have no incentive to switch to the more visible market. Since they expect to have poor performance in the future, they prefer to be pooled with all other firms that are afflicted with informational asymmetry. Besides the threat of negative revaluation, poor quality firms must incur the initial listing costs. Only good quality firms can afford to pay that price in exchange of a positive revaluation. In contrast to the less well-known firms with positive private information, well-known firms cannot derive any revaluation gains from listing. Insiders and outside investors share the same information about the firm’s quality. Listing on a more visible marketplace bestows no more visibility and depth in investor informativeness than what the firm currently enjoys. Such firms will pursue listing on a new market only for other reasons, like, for example, to reduce their liquidity costs if the latter are engendered not from firm characteristics but rather microstructure differences between the new and the old market.\textsuperscript{3}

In deriving conditions under which firms choose to issue equity in a private or public

\textsuperscript{1} The potential of stock listings to generate new information is also supported by evidence in Bradford, Martin and Whyte (2002) for a sample of cross-border listings.

\textsuperscript{2} The value effect in Merton’s (1987) model does not depend on signaling but the reduction of the cost of capital through a greater diffusion of risk sharing. This can be accomplished through listing a firm’s stock on a more visible market.

\textsuperscript{3} For example, Microsoft, Intel and other large Nasdaq stocks have no incentive to move to another market since they enjoy both, high visibility and low marketability costs.
Corwin and Harris (2001) find that firms tend to list where their peers are traded. This can generate greater release of information relevant to the possible revaluation of the newly listed firm. Chemmanur and Fulghieri (1999) note that the stricter the listing requirements of a market are the more information the firm will have to disclose to outside investors. This helps reduce the costs outside investors need to incur in order to become more informed about the firm. Therefore, stricter initial standards have the potential of causing greater production of information and hence stronger revaluation of the firm. The signaling consequences of listing are similar to those suggested by the visibility hypothesis. Less well-known firms with favorable private information have an incentive to cause a revaluation of their equity thus separating themselves from poor quality firms. They can accomplish this by listing on an exchange with stricter initial standards. The potential for revaluation is expected to be less for well-known firms. In essence, the revaluation of firms, afflicted by information asymmetry under both the visibility hypothesis and the Chemmanur and Fulghieri implication, is caused by the release of more information following the listing. More specifically, however, Chemmanur and Fulghieri condition the information release on how strict the initial listing requirements are.4

Grammatikos and Papaioannou (1986b) observe that differences in the continued listing standards among different trading venues can generate signaling effects when firms choose to list on a new market with stricter standards for continued listing than the old market. A decision to list on a market with stricter standards for continued listing presupposes that the firm’s managers believe that the firm’s performance will not deteriorate below the minimum level required by the new continued listing standards. Related to this belief is the evidence in Corwin and Harris (2001) that smaller and more volatile firms that conduct IPOs choose to list on the Nasdaq rather than the NYSE. This has signaling implications for less well-known firms. Suppose that a less well-known firm satisfies the initial listing standards but has a record of volatile performance. The announcement that this firm will list on an exchange with more rigorous continued listing standards implies that the set of worst of performance outcomes expected by managers is above the minimum level of performance required under the new higher continued listing standards. This should cause a positive revaluation of the firm. A less well-known firm with poor prospects will avoid to list on the stricter market because doing so

4 Corwin and Harris (2001) find that firms tend to list where their peers are traded. This can generate greater release of information relevant to the possible revaluation of the newly listed firm.
exposes the firm and its managers to loss of reputation as well as financial costs associated with delisting (see Sanger and Peterson (1990)). Accounting also for the initial listing costs makes the listing change a decision of negative economic value for poor quality firms. Well-known firms have no incentive to move to a market with stricter continued listing standards in order to signal that their worst performance outcomes are not as bad as expected before. This information is already shared by outside investors. Well-known firms move to another market provided the information, shared by all, suggests continued satisfaction of the listing maintenance standards and there are other benefits to be reaped by the firm.

The signaling theory of listing leads to the following testable predictions:

**Prediction 2:** Less well-known firms experience improved operating performance after listing. Well-known firms experience neutral operating performance after listing.

**Prediction 3:** Less well-known firms switching their listing from the Nasdaq to the NYSE experience greater improvement in operating performance than similar Nasdaq firms listing on the AMEX.

Prediction 3 is based on the fact that the NYSE has stricter initial standards than the AMEX and, hence, according to Chemmanur and Fulghieri there should be greater scope for market scrutiny and revaluation.

**Prediction 4:** Less well-known firms with relatively weak pre-listing operating performance that move their stock listing from the Nasdaq or the AMEX to the NYSE experience greater improvement in operating performance than similar firms that switch their listing from Nasdaq to the AMEX.

Since the NYSE has stricter continued listing standards than both the Nasdaq and the AMEX, the post-listing performance of stocks migrating to NYSE is expected to be relatively stronger so that they can continue to meet the listing maintenance standards. In addition, strong post-listing performance is expected to be more pervasive and representative of those stocks listing on the NYSE that had a relatively weak pre-listing performance.

II. **Data and Methodology**

A. **Sample and data**

The initial population of exchange listings is retrieved from the respective *Fact Books* of
the AMEX and NYSE, and is cross-verified against listing information available in the Center for Research in Security Prices (CRSP) tapes. We are able to identify a total of 1703 firms which switched listings in the 19-year period from 1978 to 1996. As shown in Table 1, the final sample of 364 firms includes 159 firms switching from Nasdaq to NYSE, 114 switching from Nasdaq to AMEX and 91 switching from AMEX to NYSE.5

Excluded from the sample are financial services firms, real estate investment trusts (REITs), closed-end funds and American Depository Receipts. We also exclude firms which had an IPO three years prior to the listing year and/or an SEO within two years before or three years after the listing year. These firms are excluded because of evidence of post-issue operating underperformance (Jain and Kini 1994; Loughran and Ritter 1997).6 The remaining sample is checked for data availability in the Compustat tapes over the years -3 to +3 relative to the year of listing change, or year 0. Firms with missing data in year -1 are dropped altogether. Firms with missing data in years -3 and -2 are excluded from tests of pre-listing operating performance but retained for tests of post-listing performance. Firms are included in the post-listing tests if they have available data at least in one of the post-listing years, +1, +2, or +3. Thus, our final sample is free of survivorship bias since it includes firms that might have been delisted for various reasons after year +1.

Table 2 shows that both well-known and less well-known firms that switch from Nasdaq to AMEX are very small in assets and equity market capitalization compared to Nasdaq and AMEX firms switching to the NYSE. The same pattern holds also for institutional ownership of equity. Nasdaq to NYSE listers have the highest institutional ownership followed by AMEX to Nasdaq listers, whereas Nasdaq to AMEX firms have the lowest institutional holdings. This pattern across types of listing changes is observed for both less well-known and well-known firms. Furthermore, well-known firms are larger in asset size and equity capitalization and have higher institutional holdings than less well-known firms across all types of listing changes.

5 Until its repeal in July 1999, Rule 500 made it impossible for NYSE listed stocks to move to Nasdaq or AMEX.

6 We identify listing firms with IPOs or SEOs around the listing year by searching the Wall Street Journal Index as well as the data base for SEOs developed by Ritter.
B. Measurement and control methods

The measurement period extends from the fiscal year -3 to the fiscal year +3 relative to the year of listing, year 0. Following Barber and Lyon (1996), we measure changes in operating performance by focusing on operating return on assets. Operating return on assets is measured as operating income or earnings before depreciation and taxes (Compustat data item 13) divided by total assets (Compustat data item 6).

The operating performance of sample firms must be compared to an appropriate benchmark. Since many of the firms that switch listing are relatively small in size and often experience unusual operating performance in the pre-listing period, we follow the matching-control firm approach prescribed by Barber and Lyon (1996). This approach takes into account the size of listing firms, their industries, and their pre-event performance. The pre-event operating performance criteria also allow us to control for the natural tendency of accounting ratios to mean-revert over time (Penman 1991). Each firm in the sample is matched with firms that satisfy the following criteria as of year -1. Their operating return on assets is in the range of 90 to 110 percent of the operating return on assets of the sample firm; their assets (measured by book value) range between 70 and 130 percent of the assets of the sample firm; and they are in the same two-digit SIC code as the sample firm. As suggested by Barber and Lyon, sample firms that are impossible to match by all three criteria are matched by pre-listing operating performance only. We use the total population of firms in the Compustat tapes to identify appropriate matches among those firms which have not undergone a listing change in the year -3 to year +3 period for the corresponding switching firm and have available data in all years in this period.

Although we examine differences in levels of operating return on assets between sample and matched portfolios, our main focus is on the match-adjusted changes of this metric computed as suggested in Barber and Lyon (1996). For each listing firm, we compute the change in the operating return on assets between year -1 and each post-listing year +1, +2 and +3. For each matched portfolio, we also compute the change in the median values of the performance measure over the same comparison intervals. We then subtract the matched portfolio change from the firm-specific change to compute the match-adjusted change in
operating performance over each interval.

We partition the sample listing firms into two groups of less well-known and well-known firms by applying two criteria. The first is the percentage of standardized institutional holdings of each firm in year -1 prior to listing. We collect percentage institutional holdings for all listing firms in our sample from the *Standard & Poors Security Owners Guide*. Since our study covers a long period during which institutional equity ownership had risen considerably, we standardize the percentage of institutional stock ownership of each listing firm by dividing the fraction of each firm’s shares held by institutions as of end of year -1 by the percentage of institutional holdings of U.S. stocks in the same year. The source for the aggregate institutional holdings is the *Securities Industry Association 1999 Fact Book*. The second criterion is the relative market-to-book equity value ratio. It is measured as the equity market-to-book ratio of each listing firm in year -1 divided by the average market-to-book ratio of the firms in the matched portfolio in the same year. A listing firm is classified as a less well-known firm if (a) its percentage of institutional holdings in year -1 is below the average percentage of institutional holdings of all U.S. stocks for that year as reported in the *Securities Industries Association* Factbook, and (b) its relative market-to-book ratio is less than the average market-to-book ratio of its matched peers in year -1. All other firms are classified as well-known.

III. Results and Discussion
A. Empirical findings

Table 3 reports the post-listing operating performance of the groups of listing firms classified as less well-known and well-known. Less well-known firms, as a whole, experience an erosion of operating performance in the period from year -1 to year +3. Their median operating return on assets is 18.04 percent in year -1 but drops to 13.56 percent by year +3. Their benchmark peers also realize a deterioration which is, however, less severe. Thus, the

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7 The market-to-book ratio is the market value of equity (Compustat data item #24 multiplied by data item #25) divided by the book value of equity (Compustat data item #60).
match-adjusted change in operating return on assets is significantly negative in year +3. The pattern of progressive decline in operating performance persists across all three types of listing changes, i.e., Nasdaq to NYSE, Nasdaq to AMEX and AMEX to NYSE. However, whereas Nasdaq to NYSE and Nasdaq to Amex listers experience statistically significant and negative match-adjusted changes in operating return on assets, the AMEX to NYSE listers do not. Well-known firms experience similar erosion in their operating performance but the decline is not as pronounced relative to their control firms as in the case of the less well-known firms. More specifically, the AMEX to NYSE sample firms realize match-adjusted changes in operating return on assets which are indistinguishable from the changes realized by their control peers. The same observation holds for the Nasdaq to NYSE listing firms, which actually realize a statistically significant positive match-adjusted change in year +1. The most severe declines are confined to the group of well-known Nasdaq firms that move to the AMEX.

In general, these findings are not consistent with the signaling theories of listing, and in particular with Prediction 1. This prediction suggests that less well-known firms realize improved operating performance following the listing change. The findings are more consistent with the opportunistic timing hypothesis. This conclusion is reinforced by the finding that Nasdaq to AMEX listings generate relatively worse operating performance for both groups of well-known and less well-known firms. As Table 2 shows, these are very small firms that may have greater difficulty sustaining the initial listing standards over a longer time period.

In Table 4, we report tests of differences in match-adjusted changes of operating return on assets between the less well-known and the well-known firms. In general, less well-known firms perform worse than well-known firms, especially in the sample of Nasdaq to NYSE firms. This finding is inconsistent with the signaling theories of listing.

To gain further empirical insight regarding the visibility hypothesis, we perform a more direct test and report findings in Table 5. Specifically, we regress the match adjusted changes of listing firms from year -1 to year +1 on the change in their standardized institutional holdings over the same interval and an interaction term of the changes in institutional holdings and a dummy variable, which equals 1 for observations referring to the less well-known firms. According to the visibility version of signaling, the coefficient of both independent variables must be positive. No such evidence is revealed in the regression results of Table 5.
Prediction 3, based on the Chemmanur and Fulghieri conjecture suggests that less well-known firms that list on an exchange with stricter initial listing standards should realize greater improvement in operating performance than firms listing on an exchange with less strict standards. The results reported in Table 6 do not support this prediction. Less well-known Nadsaq firms moving to the NYSE (the stricter exchange) do not realize greater match-adjusted changes in operating return on assets than less well-known firms that move from Nasdaq to the AMEX (the less strict exchange). Actually the opposite is true although the differences are not statistically significant. It is interesting to note that evidence reported in Baker, Powell and Weaver (1999a and 1999b) reveals that an AMEX listing of a Nasdaq stock produces significant improvements in visibility proxies (like shares held by institutions) whereas this is not confirmed for NYSE listings of Nadsaq stocks. Nonetheless, the negative statistically significant match-adjusted changes of less well-known firms moving from Nasdaq to NYSE is not consistent with the Chemmanur and Fulghieri proposition that stricter listing standards lead to greater information production, and, hence provide greater scope for revaluation.

Table 7 reports match-adjusted changes in operating return on assets for less well-known and well-known firms which have been classified, respectively, into groups of firms with superior and inferior operating performance in the pre-listing period. A listing firm is considered to have superior pre-listing performance if its match-adjusted change of operating return on assets in the interval year -3 to year -1 is greater than the change realized by the listing firm’s control peers over the same interval. The converse is true for inferior listing firms. We observe that inferior and less well-known firms moving from Nasdaq or AMEX to the NYSE perform better in the post-listing period than superior and less well-known firms. Unlike the experience of superior and less well-known firms, on a match-adjusted basis, the changes in operating return on assets of less well-known firms with inferior pre-listing performance are not significantly different from zero in any of the three intervals. This is confirmed in Panel C where we report results of tests of difference in match-adjusted changes in operating return on assets between inferior and superior less well-known firms.8 Similarly, within the groups of

8 The signs of the z-scores reported in Panel C are not indicative of the direction of the difference. In Panels A and B, respectively, we observe that in the interval year -1 to year +2 inferior and less well-known firms have a match-adjusted change in operating return of 0.58
inferior listing firms (Panel B) the less well-known firms perform better than the superior firms. Finally, in Panel D, we present evidence on the operating performance of two groups of firms: the group of less well-known firms with inferior pre-listing performance that move from Nasdaq or AMEX to the NYSE and the group of similar firms that move from Nasdaq to AMEX. The continued listing standards version of the signaling hypothesis (prediction 4) suggests that firms with weaker records of pre-listing performance that list on the NYSE (the market with the stricter continued listing standards) should realize better performance than similar firms that list on the AMEX (the market with the less stringent requirements for continued listing). Panel D shows no difference in the match-adjusted changes in post-listing operating returns between Nasdaq and AMEX firms listing on the NYSE and Nasdaq firms listing on the AMEX. Although this evidence does not seem to support prediction 4, Panel D also shows two important differences between the two groups. First, Nasdaq and AMEX firms listing on the NYSE have a higher operating return on assets in year -1 than Nasdaq firms listing on AMEX. It is, therefore, more difficult for the NYSE listers to maintain this high level of performance. Second, despite this relatively high level of pre-listing performance, NYSE listers continue to realize unadjusted post-listing operating returns which remain considerably above the returns realized by the AMEX listers. Overall, this evidence support the Grammatikos and Papaioannou version of the signaling hypothesis that the listing of weak firms on a stricter market reveal positive private information about the firms’ future prospects.

**B. Discussion**

The overall findings reported in this study provide evidence in favor of the timing hypothesis. Listing firms experience a gradual erosion of their operating performance in the post-listing period. This finding is consistent with previous evidence in Dharan and Ikenberry (1995), Webb (1999) and Papaioannou, Travlos and Viswanathan (2002). There is no evidence to support the visibility and information production versions of the signaling theory of listing. Less well-known firms do not demonstrate the greater improvement in operating performance predicted by these versions of signaling through listing. However, the findings provide support whereas superior and well-known firms have a significant negative change of -1.90.
for the signaling version based on a revaluation prompted by the stricter continued listing standards of the new market. We find that firms with weak pre-listing performance tend to have relatively better post-listing performance than other types of firms when they move to a market with stricter continued listing standards.

It seems, therefore, that more than opportunistic timing drives the stock listing changes. It is generally observed that firms initiate the decision to move their stock listing following a period of unusually strong operating performance. Many of these firms, and especially those which are small and less well-followed (typically the Nasdaq to AMEX listers), are unable to maintain these gains on an unadjusted or match-adjusted basis. However, a subset of firms that has performed weakly in the pre-listing period and move to a market with stricter standards for continued listing manage to perform better than other less well-known firms with stronger pre-listing performance despite the fact that the inferior performance listers still produce negative unadjusted changes in operating return. This implies that both timing and positive information effects are at play for such firms. Specifically, among the firms with volatile and weak performance only those that reach a performance level sufficient to satisfy the initial listing standards of the new market and also have favorable private information about their future ability to remain listed in the new stricter trading venue decide to list. The concern of these firms is not whether their (unadjusted) performance will fall in the post-listing period but whether they can perform above the minimum level warranted by the new listing maintenance standards the firm will need to satisfy. For such firms, therefore, it is possible to observe both an erosion in performance (signifying timing) as well as a superior performance (on a match-adjusted basis) relative to other listing firms.

IV. Summary and Implications

In this paper, we develop predictions based, respectively, on the timing and signaling

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9 In unreported tests, we find that both less well-known and well-known firms (with frequencies of 60 percent or higher) realize gains in (unadjusted) operating return on assets during the pre-listing period which, although similar to the gains posted by the control firms, are statistically meaningful.
hypotheses. We suggest that the timing hypothesis implies the presence of unfavorable private information whereas, conversely, the signaling hypothesis implies the presence of favorable information. Accordingly, we predict that less well-known firms are the types of firms that may engage in opportunistic selection of their listing decision, or will benefit from the positive effects of signaling. In addition, we propose more specific signaling-related predictions based on the implications the initial and continued listing standards have for the post-listing revaluation of the firm. We test these predictions by examining the changes in the operating performance, measured by operating return on assets, of firms that switch their stock listings to a new market. We account for mean reversion and other effects by constructing appropriate benchmarks represented by firms that match the listing firms in asset size, pre-listing operating performance and industry classification. According to the testable propositions of the study we focus on the difference in operating performance across listing firms classified as well-known and less well-known, with primary attention given to the latter group.

We find strong evidence in favor of the timing hypothesis. Overall, listing firms underperform in the post-listing period.\(^ {10}\) The performance declines, however, seem to be concentrated within the small and less well-followed Nasdaq firms that move to the AMEX. This supports the overall notion that managers self-select the timing of their decisions. The evidence for timing confirms the conclusions drawn in the earlier exchange listing studies of Dharan and Ikenberry (1995), Webb (1999) and Papaioannou, Travlos and Viswanathan (2002). We find no evidence to support the two versions of signaling based on improved visibility and greater information production and release due to listing. Less well-known firms do not demonstrate the performance gains (relative to well-known firms) implied by these expected effects from listing. This evidence differs from the findings of other studies of domestic and cross-border listings (Kadlec and McConnell (1994), Foerster and Karolyi (1999) and Baker, Nofsinger and Weaver (2002)) that listing has positive value effects by increasing investor recognition. They reach this conclusion by relating the reduction in the expected returns of listing stocks to increases in visibility proxies as predicted in Merton (1987). This study argues

\(^{10}\) Since timing implies negative private information, it is puzzling why insiders are net purchasers of their firm’s stock up to six months following listing (Lamba and Kahn (1999)).
that these listing benefits have signaling implications for less well-known firms that stand to gain the most in visibility and investor recognition. The evidence, based on a cash flow measure of operating performance, is not, however, consistent with these signaling implications.

On the other hand, there is evidence that post-listing performance is conditioned on the continued listing standards of the new market. Less well-known firms with weak pre-listing performance do better (on a match-adjusted basis) compared to other listing firms after listing. Based on this finding, we propose that although timing of the listing decision is related to unusually good performance, firms with inferior performance, which are concerned with maintenance of their new listing, initiate the change if they also have favorable private information about their ability to satisfy the ongoing listing requirements on the new market.

Overall, these findings provide a better understanding of the listing decision. Although timing seems to play a significant part in listing decisions, other considerations matter. Critical, in this respect, is the inside information about the firm’s ability to maintain its new listing if the firm has had a relatively weak performance record. This finding has interesting implications for the competition among exchanges. Stricter continued listing standards invite listings from better quality firms and offer such firms an additional tool of signaling, that in itself can attract more listings.

REFERENCES


Baker, H. K., J. R. Nofsinger and D. G. Weaver, 2002, International Cross-Listing and


## Table 1  Sample of Firms that Switched their Stock Listings

<table>
<thead>
<tr>
<th>Year of Listing Change</th>
<th>Number of Firms Switching from:</th>
<th>Total</th>
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<tr>
<td></td>
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</tr>
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<tr>
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<td>1995</td>
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<tr>
<td>1996</td>
<td>19</td>
<td>5</td>
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</table>

Sample Total 159 114 91 364

Total Listings 1978-1996 714 640 349 1703

Note: This table shows the annual distribution of the sample of 364 firms that switched their stock listings during the period 1978 to 1996. The last row shows all the listing changes in the period 1978 to 1996.
Table 2  
Selected Characteristics of Sample of Switching Firms

<table>
<thead>
<tr>
<th>Variable</th>
<th>All Firms</th>
<th>Firms Switching From:</th>
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<th></th>
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<td>Nasdaq to NYSE</td>
<td>Nasdaq to AMEX</td>
<td>NYSE</td>
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</tr>
<tr>
<td>Less-Well-Known Firms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Firms</td>
<td>159</td>
<td>55</td>
<td>63</td>
<td>41</td>
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</tr>
<tr>
<td>Average Total Assets (in $ Mil)</td>
<td>149.3</td>
<td>246.5</td>
<td>38.7</td>
<td>188.1</td>
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<tr>
<td>Median Total Assets (in $ Mil)</td>
<td>64.1</td>
<td>152.9</td>
<td>23.2</td>
<td>84.2</td>
<td></td>
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<tr>
<td>Average Market Capitalization (in $ Mil)</td>
<td>110.2</td>
<td>185.8</td>
<td>37.0</td>
<td>119.3</td>
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<tr>
<td>Median Market Capitalization (in $ Mil)</td>
<td>45.3</td>
<td>117.0</td>
<td>13.3</td>
<td>68.2</td>
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<tr>
<td>Average Standardized Institutional Holdings (%)</td>
<td>35.3</td>
<td>51.8</td>
<td>17.9</td>
<td>39.7</td>
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<tr>
<td>Median Standardized Institutional Holdings (%)</td>
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<td>56.4</td>
<td>11.4</td>
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<td></td>
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<tr>
<td>Number of Firms</td>
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<td>51</td>
<td>50</td>
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<tr>
<td>Average Total Assets (in $ Mil)</td>
<td>310.9</td>
<td>368.1</td>
<td>64.1</td>
<td>441.0</td>
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<tr>
<td>Median Total Assets (in $ Mil)</td>
<td>129.4</td>
<td>195.0</td>
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<td>161.6</td>
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<tr>
<td>Average Market Capitalization (in $ Mil)</td>
<td>491.9</td>
<td>633.8</td>
<td>45.3</td>
<td>649.3</td>
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<td>Median Market Capitalization (in $ Mil)</td>
<td>162.2</td>
<td>260.1</td>
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<td>177.1</td>
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<tr>
<td>Average Standardized Institutional Holdings (%)</td>
<td>69.4</td>
<td>93.2</td>
<td>25.3</td>
<td>64.9</td>
<td></td>
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<tr>
<td>Median Standardized Institutional Holdings (%)</td>
<td>64.3</td>
<td>101.7</td>
<td>10.4</td>
<td>62.5</td>
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</tbody>
</table>

Note: This table shows selected characteristics of the 364 firms that switched their stock listings during the period 1978 to 1996. A listing firm is classified as a Less-Well-Known firm if (i) its market-to-book ratio is less than the average market-to-book ratio of the matched firms in year -1, and (ii) the institutional holdings of its equity in year –1 is less than the average institutional holdings of equity of all US stocks for that year as reported by the Securities Industries Association Factbook, and as a Well-Known firm otherwise. Total assets, market capitalization (equity market value) and standardized institutional holdings of firms reported are for the year prior to the change in market listing. The standardized institutional holdings are computed by dividing the percentage of institutional share holdings of each switching firm by the percentage of institutional holdings of U.S. stocks for the same year as reported in the Securities Industry Association 1999 Factbook.
Table 3  Post-Listing Operating Performance of Less-Well-Known and Well-Known Switching Firms

<table>
<thead>
<tr>
<th>Panel A.</th>
<th>Operating Performance of Less-Well-Known Firms</th>
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<tr>
<td><strong>All Switching Firms</strong></td>
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<tr>
<td>Listing Firms</td>
<td>Median Level in Year –1: 18.04***</td>
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<tr>
<td>Matched Firms</td>
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<td>Z Statistic of Difference</td>
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<td>Nasdaq to NYSE</td>
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<tr>
<td>Listing Firms</td>
<td>Median Level in Year –1: 19.01***</td>
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<td>Matched Firms</td>
<td>Median Level in Year +1: 18.61***</td>
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<td>Z Statistic of Difference</td>
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<tr>
<td>Nasdaq to AMEX</td>
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<tr>
<td>Listing Firms</td>
<td>Median Level in Year –1: 17.28***</td>
</tr>
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<td>Matched Firms</td>
<td>Median Level in Year +1: 17.25***</td>
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<td>Z Statistic of Difference</td>
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<td>AMEX to NYSE</td>
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<tr>
<td>Listing Firms</td>
<td>Median Level in Year –1: 17.88***</td>
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<td>Matched Firms</td>
<td>Median Level in Year +1: 17.86***</td>
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<table>
<thead>
<tr>
<th>Panel B.</th>
<th>Operating Performance of Well-Known Firms</th>
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<tr>
<td><strong>All Switching Firms</strong></td>
<td></td>
</tr>
<tr>
<td>Listing Firms</td>
<td>Median Level in Year –1: 17.96***</td>
</tr>
<tr>
<td>Matched Firms</td>
<td>Median Level in Year +1: 16.22***</td>
</tr>
</tbody>
</table>

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**Notes:**
- ***p < 0.1
- **p < 0.05
- ***p < 0.01
<table>
<thead>
<tr>
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<th>Matched Firms</th>
<th>Matched Firms</th>
<th>Matched Firms</th>
<th>Matched Firms</th>
<th>Matched Firms</th>
<th>Match-Adjusted Change</th>
<th>Number of Observations</th>
<th>Nasdaq to NYSE</th>
<th>Nasdaq to AMEX</th>
<th>AMEX to NYSE</th>
<th>Nasdaq to AMEX</th>
<th>AMEX to NYSE</th>
<th>Number of Observations</th>
<th>Nasdaq to NYSE</th>
<th>Nasdaq to AMEX</th>
<th>AMEX to NYSE</th>
<th>Number of Observations</th>
</tr>
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<td></td>
<td>17.39***</td>
<td>14.87***</td>
<td>14.27***</td>
<td>14.54***</td>
<td>-1.50***</td>
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<td>-2.44***</td>
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<td>101</td>
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<td>19.22***</td>
<td>17.40***</td>
<td>17.33***</td>
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<td>-3.89***</td>
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<tr>
<td></td>
<td>0.28</td>
<td>1.62</td>
<td>1.08</td>
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<td>1.60</td>
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<td>12.33***</td>
<td>10.90***</td>
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<td>7.36***</td>
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<td>-5.62***</td>
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<td>48</td>
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<tr>
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<td>0.00</td>
<td>-0.94</td>
<td>-1.73**</td>
<td>-1.68**</td>
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<td>-3.69*</td>
<td>-1.51</td>
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<tr>
<td></td>
<td>17.60***</td>
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</tr>
</tbody>
</table>

Note: This table shows median levels and median changes of post-listing operating performance for firms that switched from the Nasdaq to the NYSE, and the AMEX to the NYSE during the period 1978 to 1996. The listing sample consists of 250 firms out of 1063 firms that switched their stock listing from Nasdaq and AMEX to the NYSE during this period. The actual number of firms used in this analysis may vary due to missing data. Financial services firms, real estate investment trusts, closed-end funds and American Depository Receipts are excluded from the sample. Firms with initial public offering in the three years prior to listing and seasoned equity offerings in the two years before and three years after the listing are excluded. Firms with missing data in year –1 are also excluded. Operating performance is measured as operating return on assets expressed as a percentage. The matched sample is formed by matching each firm in the listing sample to a portfolio of non-switching firms based on size, operating performance and industry classification in year -1. A listing firm is classified as a Less-Well-Known firm if (i) its market-to-book ratio is less than the average market-to-book ratio of the matched firms in year -1, and (ii) the institutional holdings of its equity in year –1 is less than the average institutional holdings of equity of all US stocks for that year as reported by the Securities Industries Association Factbook, and as a Well-Known firm otherwise. The significance tests are based on the Wilcoxon signed rank test. The Z statistics reported are for the differences in median levels of the listing firms and the matched firms, and are based on the Wilcoxon two-sample signed rank test.

*** Significant at 1 percent
** Significant at 5 percent
* Significant at 10 percent
### Table 4  
**Comparison of Post-Listing Operating Performance of Less-Well-Known and Well-Known Switching Firms**

<table>
<thead>
<tr>
<th></th>
<th>Median Change From Year –1 to +1</th>
<th>Median Change From Year –1 to +2</th>
<th>Median Change From Year –1 to +3</th>
</tr>
</thead>
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<tr>
<td><strong>All Switching Firms</strong></td>
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<td></td>
</tr>
<tr>
<td>Match-Adjusted Change of Less-Well-Known Firms</td>
<td>-0.70</td>
<td>-0.86</td>
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<td>145</td>
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<tr>
<td>Match-Adjusted Change of Well-Known Firms</td>
<td>0.86</td>
<td>0.73</td>
<td>-0.12</td>
</tr>
<tr>
<td>Number of Observations</td>
<td>202</td>
<td>193</td>
<td>185</td>
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<tr>
<td>Z-Score of Difference between Less-Well-Known and Well-Known Firms</td>
<td>-1.95 **</td>
<td>-1.27</td>
<td>-0.70</td>
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<tr>
<td><strong>Nasdaq to NYSE Firms</strong></td>
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<td></td>
</tr>
<tr>
<td>Match-Adjusted Change of Less-Well-Known Firms</td>
<td>-1.29 *</td>
<td>-2.32 *</td>
<td>-1.24</td>
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<tr>
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<td>51</td>
<td>48</td>
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<tr>
<td>Match-Adjusted Change of Well-Known Firms</td>
<td>1.75 **</td>
<td>1.60</td>
<td>0.80</td>
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<td>94</td>
<td>90</td>
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<td>Z-Score of Difference between Less-Well-Known and Well-Known Firms</td>
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<td>-2.03 *</td>
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<td><strong>Nasdaq to AMEX Firms</strong></td>
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<tr>
<td>Number of Observations</td>
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<th>Match-Adjusted Change of</th>
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<th>-1.38</th>
<th>-3.69*</th>
<th>-1.51</th>
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<tbody>
<tr>
<td>Number of Observations</td>
<td>51</td>
<td>49</td>
<td>48</td>
<td></td>
</tr>
</tbody>
</table>

| Z-Score of Difference between Less- | Well-Known Firms | -0.40 | -0.73 | 0.24 |
| Well-Known and Well-Known Firms   |                   |       |       |      |

<table>
<thead>
<tr>
<th>AMEX to NYSE Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Match-Adjusted Change of</td>
</tr>
<tr>
<td>Less-Well-Known Firms</td>
</tr>
<tr>
<td>Number of Observations</td>
</tr>
</tbody>
</table>

| Match-Adjusted Change of |
| Well-Known Firms | 1.45 | 1.04 | -0.54 |
| Number of Observations | 50    | 50  | 47    |

| Z-Score of Difference between Less- | Well-Known Firms | -0.71 | -0.39 | 0.44 |
| Well-Known and Well-Known Firms   |                   |       |       |      |

Note: This table shows median changes of post-listing operating performance for firms that switched from the Nasdaq to the NYSE, the Nasdaq to the AMEX, and the AMEX to the NYSE during the period 1978 to 1996. The listing sample consists of 364 firms out of 1703 firms that switched their stock listing during this period. The actual number of firms used in this analysis may vary due to missing data. Financial services firms, real estate investment trusts, closed-end funds and American Depository Receipts are excluded from the sample. Firms with initial public offering in the three years prior to listing and seasoned equity offerings in the two years before and three years after the listing are excluded. Firms with missing data in year –1 are also excluded. Operating performance is measured as operating return on assets expressed as a percentage. The matched sample is formed by matching each firm in the listing sample to a portfolio of non-switching firms based on size, operating performance and industry classification in year -1. A listing firm is classified as a Less-Well-Known firm if(i) its market-to-book ratio is less than the average market-to-book ratio of the matched firms in year -1, and (ii) the institutional holdings of its equity in year –1 is less than the average institutional holdings of equity of all US stocks for that year as reported by the Securities Industries Association Factbook, and as a Well-Known firm otherwise. The significance tests are based on the Wilcoxon signed rank test. The Z statistics reported are for the differences in median levels of the listing firms and the matched firms, and are based on the Wilcoxon two-sample signed rank test.

*** Significant at 1 percent
** Significant at 5 percent
Table 5 Relationship Between Operating Performance and Changes In Institutional Holdings of Switching Firms

\[
\text{Change in Operating Performance} = a_0 + a_1 (\text{Change in Institutional Holdings}) + a_3 (\text{Change in Institutional Holdings} \times D)
\]

\[
\begin{array}{ccc}
0.0014 & + & 0.0003 & - & 0.00003 \\
(0.15) & & (0.64) & & (-0.04)
\end{array}
\]

\[F = 0.28\]
\[\text{Adj } R^2 = -0.004\]

Note: This table shows parameter estimates of the regression of Change in Operating Performance from year \(-1\) to year \(+1\) on Change in Institutional Holdings for firms that switched from the Nasdaq to the NYSE, the Nasdaq to the AMEX, and the AMEX to the NYSE during the period 1978 to 1996. The listing sample consists of 364 firms out of 1703 firms that switched their stock listing during this period. The actual number of firms used in this analysis may vary due to missing data. Financial services firms, real estate investment trusts, closed-end funds and American Depository Receipts are excluded from the sample. Firms with initial public offering in the three years prior to listing and seasoned equity offerings in the two years before and three years after the listing are excluded. Firms with missing data in year \(-1\) are also excluded. Operating performance is measured as operating return on assets expressed as a percentage. \(D\) is a dummy variable that has a value of 1 for Less-Well-Known firms and 0 for Well-Known firms. A listing firm is classified as a Less-Well-Known firm if (i) its market-to-book ratio is less than the average market-to-book ratio of the matched firms in year \(-1\), and (ii) the institutional holdings of its equity in year \(-1\) is less than the average institutional holdings of equity of all US stocks for that year as reported by the Securities Industries Association Factbook, and as a Well-Known firm otherwise. The change in institutional holdings is the change from year \(-1\) to year \(+1\). The t-statistics for the parameter estimates are shown in parenthesis.

*** Significant at 1 percent
** Significant at 5 percent
* Significant at 10 percent
### Table 6  Comparison of Post-Listing Operating Performance of Less-Well-Known and Well-Known Switching Firms

<table>
<thead>
<tr>
<th>Operating Performance of Less-Well-Known Firms Switching from the Nasdaq to NYSE or AMEX</th>
<th>Median Change From Year –1 to +1</th>
<th>Median Change From Year –1 to +2</th>
<th>Median Change From Year –1 to +3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Match-Adjusted Change of Firms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switching from Nasdaq to NYSE</td>
<td>-1.29*</td>
<td>-2.32**</td>
<td>-1.24**</td>
</tr>
<tr>
<td>Number of Observations</td>
<td>55</td>
<td>51</td>
<td>48</td>
</tr>
<tr>
<td>Match-Adjusted Change of Firms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switching from Nasdaq to AMEX</td>
<td>0.89</td>
<td>-0.52</td>
<td>-1.33**</td>
</tr>
<tr>
<td>Number of Observations</td>
<td>63</td>
<td>61</td>
<td>59</td>
</tr>
<tr>
<td>Z-Score for Difference between Nasdaq to NYSE and Nasdaq to AMEX Firms</td>
<td>-1.07</td>
<td>-0.66</td>
<td>0.68</td>
</tr>
</tbody>
</table>

Note: This table shows median levels and median changes of post-listing operating performance for firms that switched from the Nasdaq to the NYSE, the Nasdaq to the AMEX, and the AMEX to the NYSE during the period 1978 to 1996. The listing sample consists of 364 firms out of 1703 firms that switched their stock listing during this period. The actual number of firms used in this analysis may vary due to missing data. Financial services firms, real estate investment trusts, closed-end funds and American Depository Receipts are excluded from the sample. Firms with initial public offering in the three years prior to listing and seasoned equity offerings in the two years before and three years after the listing are excluded. Firms with missing data in year –1 are also excluded. Operating performance is measured as operating return on assets expressed as a percentage. The matched sample is formed by matching each firm in the listing sample to a portfolio of non-switching firms based on size, operating performance and industry classification in year -1. A listing firm is classified as a Less-Well-Known firm if (i) its market-to-book ratio is less than the average market-to-book ratio of the matched firms in year -1, and (ii) the institutional holdings of its equity in year –1 is less than the average institutional holdings of equity of all US stocks for that year as reported by the Securities Industries Association Factbook, and as a Well-Known firm otherwise. The significance tests are based on the Wilcoxon signed rank test. The Z statistics reported are for the differences in median levels of the listing firms and the matched firms, and are based on the Wilcoxon two-sample signed rank test.

*** Significant at 1 percent
** Significant at 5 percent
* Significant at 10 percent
Table 7  Post-Listing Operating Performance of Switching Firms Grouped by Pre-Listing Operating Performance

<table>
<thead>
<tr>
<th>Panel A. Operating Performance of Firms with Superior Pre-Listing Operating Performance Switching from the Nasdaq or AMEX to NYSE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Less-Well-Known Firms</strong></td>
</tr>
<tr>
<td>Listing Firms</td>
</tr>
<tr>
<td>Matched Firms</td>
</tr>
<tr>
<td>Match-Adjusted Change</td>
</tr>
<tr>
<td>Number of Observations</td>
</tr>
<tr>
<td><strong>Well-Known Firms</strong></td>
</tr>
<tr>
<td>Listing Firms</td>
</tr>
<tr>
<td>Matched Firms</td>
</tr>
<tr>
<td>Match-Adjusted Change</td>
</tr>
<tr>
<td>Number of Observations</td>
</tr>
<tr>
<td>Z-Score for Difference in Median Change between Less-Well-Known and Well-Known Firms</td>
</tr>
</tbody>
</table>

Panel B. Operating Performance of Firms with Inferior Pre-Listing Operating Performance Switching from the Nasdaq or AMEX to NYSE

<table>
<thead>
<tr>
<th><strong>Less-Well-Known Firms</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Listing Firms</td>
</tr>
<tr>
<td>Matched Firms</td>
</tr>
<tr>
<td>Match-Adjusted Change</td>
</tr>
<tr>
<td>Number of Observations</td>
</tr>
<tr>
<td><strong>Well-Known Firms</strong></td>
</tr>
<tr>
<td>Listing Firms</td>
</tr>
<tr>
<td>Matched Firms</td>
</tr>
<tr>
<td>Match-Adjusted Change</td>
</tr>
<tr>
<td>Number of Observations</td>
</tr>
<tr>
<td>Z-Score for Difference in Median Change between Less-Well-Known and Well-Known Firms</td>
</tr>
</tbody>
</table>
Panel C. Comparison of Superior and Inferior Less-Well-Known Firms

Z-Score for Difference in Median Change between Superior and Inferior Less-Well-Known Firms 0.43 1.52* 0.17

Panel D. Operating Performance of Less-Well-Known Firms with Inferior Pre-Listing Operating Performance Switching from the Nasdaq or AMEX to NYSE and the Nasdaq to AMEX

<table>
<thead>
<tr>
<th>Nasdaq or AMEX to NYSE</th>
<th>Listing Firms</th>
<th>Matched Firms</th>
<th>Match-Adjusted Change</th>
<th>Number of Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17.89***</td>
<td>17.67***</td>
<td>-0.34</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>16.13***</td>
<td>16.75***</td>
<td>0.58</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>15.76***</td>
<td>16.07***</td>
<td>-0.81</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>15.71***</td>
<td>15.32***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-2.33***</td>
<td>-1.38***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-2.57***</td>
<td>-1.38***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-3.73***</td>
<td>-2.07***</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nasdaq to AMEX</th>
<th>Listing Firms</th>
<th>Matched Firms</th>
<th>Match-Adjusted Change</th>
<th>Number of Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>13.67***</td>
<td>13.51***</td>
<td>0.24</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>13.63***</td>
<td>11.32***</td>
<td>-0.52</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>11.35***</td>
<td>11.21***</td>
<td>0.38</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>14.71***</td>
<td>13.59***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-1.71</td>
<td>-0.32</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-2.21*</td>
<td>-0.53</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-3.07*</td>
<td>-0.86</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Z-Score for Difference in Median Change between Less-Well-Known and Well-Known Firms 0.43 -0.79 -0.28

Note: This table shows median levels and median changes of post-listing operating performance for firms that switched from the Nasdaq to the NYSE, and the AMEX to the NYSE during the period 1978 to 1996. The listing sample consists of 250 firms out of 1063 firms that switched their stock listing from Nasdaq and AMEX to the NYSE during this period. The actual number of firms used in this analysis may vary due to missing data. Financial services firms, real estate investment trusts, closed-end funds and American Depository Receipts are excluded from the sample. Firms with initial public offering in the three years prior to listing and seasoned equity offerings in the two years before and three years after the listing are excluded. Firms with missing data in year –1 are also excluded. Operating performance is measured as operating return on assets expressed as a percentage. The matched sample is formed by matching each firm in the listing sample to a portfolio of non-switching firms based on size, operating performance and industry classification in year -1. Firms are classified into superior and inferior firms based on the change in operating performance of the listing firm from year –3 to year –1 relative to the change in operating performance of the matched firms. A listing firm is classified as a Less-Well-Known firm if (i) its market-to-book ratio is less than the average market-to-book ratio of the matched firms in year -1, and (ii) the institutional holdings of its equity in year –1 is less than the average institutional holdings of equity of all US stocks for that year as reported by the Securities Industries Association Factbook, and as a Well-Known firm otherwise. The significance tests are based on the Wilcoxon signed rank test. The Z statistics reported are for the differences in median levels of the listing firms and the matched firms, and are based on the Wilcoxon two-sample signed rank test.

*** Significant at 1 percent