

Do Seasoned Offerings Really Signal Anything Significant from Insiders?

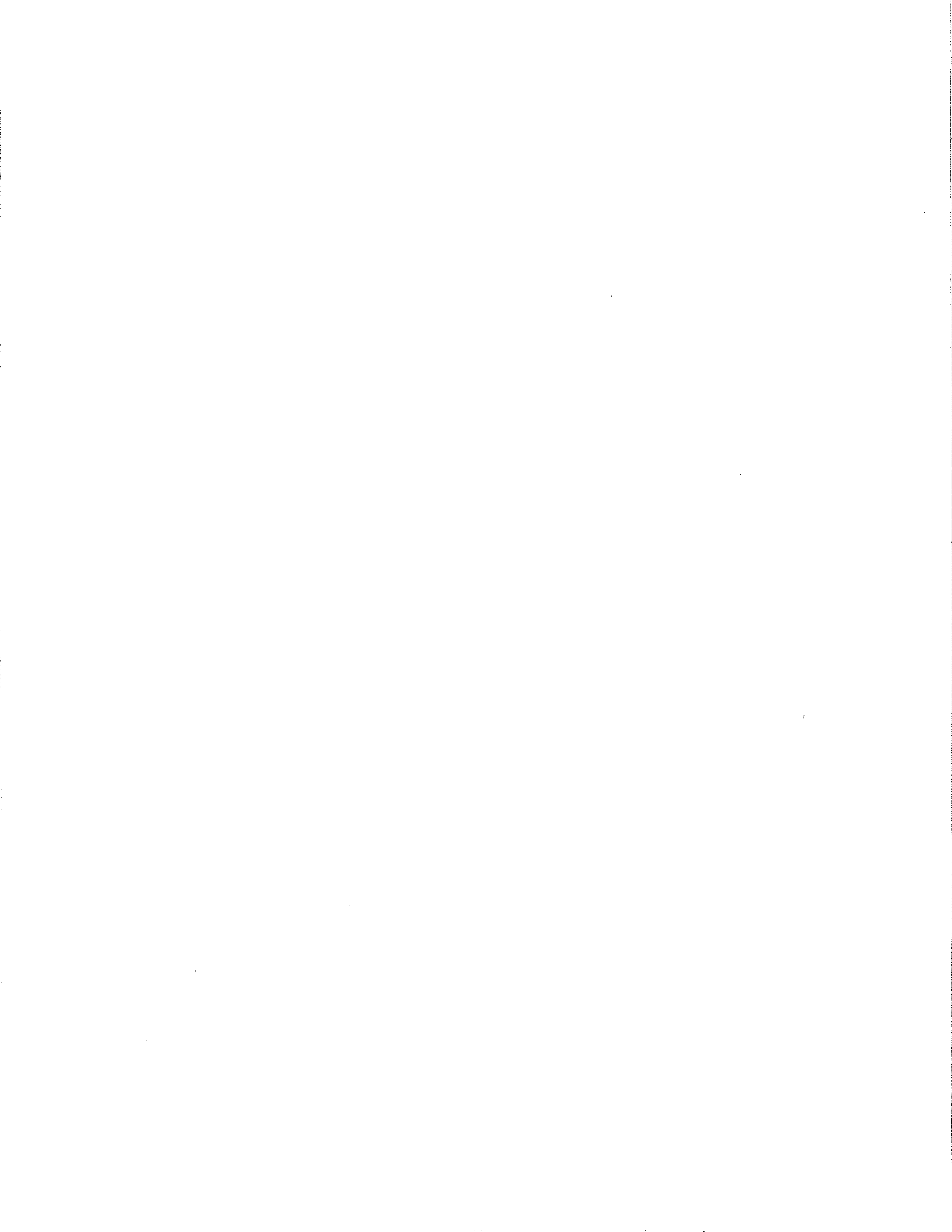
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Do Seasoned Offerings Really Signal Anything Significant from Insiders?

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ABSTRACT

We examine the impact of insider behavior that accompanies seasoned offerings (SEOs) and discover three unexpected findings. First, firms with greater insider ownership percentages underperform before SEOs compared to firms with lesser percentages. Second, insiders can use SEOs to maximize their own short-run welfare because the response to an SEO announcement does not depend on the “change” in insider ownership percentages but only on the “absolute” percentage that remains after the offering. Third, firms that undergo greater decreases in insider ownership perform much better after SEOs. This finding is economically and statistically significant suggesting that investors should be skeptical of insider ability to predict future performance. In fact, the evidence suggests investors should do just the opposite of insiders!

Keywords: Insider ownership; Seasoned Equity Offerings; Signaling Theory; Announcement Period Stock Returns

JEL Codes: D82 (Asymmetric and Private Information),
G14 (Information and Market Efficiency; Event Studies),
G32 (Financing Policy; Capital and Ownership Structure)



1. Introduction and Overview of Findings

In this paper, we cover two lines of research: insider signaling and seasoned offerings (SEOs). In regards to insider signaling, we explore the market response to both (i) the absolute level of insider ownership as represented by ownership percentage after the SEO and (ii) the change in insider ownership percentage brought about by the SEO.¹ By testing both the “absolute” percentage and the “change” in this percentage, we are able to simultaneously test and compare two prominent and related signaling theories: Myers and Majluf (1984) and Leland and Pyle (1977). The comparison is achievable because the Myers and Majluf line of research can address the absolute percentage of insider holdings while the Leland and Pyle lineage focuses more on what insiders are overtly doing.

For a firm with financial slack, Myers and Majluf argue that an equity offering sends a negative signal. Managers do not need to dilute current shareholder wealth by issuing equity for a good project when financial slack enables them to issue debt. Thus, issuing equity can only indicate that it is overvalued. Given that insiders know more, it follows that firms with higher “absolute” percentages of insider ownership signal more negative news when announcing an SEO. In considering a firm seeking additional equity financing for a project, Leland and Pyle (like Myers and Majluf) point out that insiders alone know the project's worth. Outsiders can only observe the insider commitment to the project through “changes” in their ownership percentages. Thus, Leland and Pyle predict that outsider reaction to the equity offering will be positively related to the direction of the change in the insider ownership percentage. Myers and Majluf state that the Leland and Pyle prediction is an extension of their model. Concerning the Leland and Pyle theory, Myers and Majluf (1984) write:

“... the outside investors observe the fraction of the entrepreneur's personal wealth committed to the project, and set their valuation accordingly ... This suggests a possible extension to our model. If managers also are (old) stockholders, then managers' inside information may be conveyed by the amount of the new issue they are willing to buy for their personal portfolios.”

A sample of S EOs provide a n excellent “laboratory” to conduct a c omparative experiment on the relative strengths of signaling theories based in the absolute amount of insider ownership versus the percentage change in the amount of insider ownership. This is because SEO announcements are accompanied by prospectuses that often provide the required information to know both the “absolute” percentage of insider ownership after the announcement as well as the “change” in the ownership percentage that accompanies

¹ Section 16 of the Securities Exchange Act of 1934 defines insiders as officers, directors, and beneficial owners. "Officer" refers to president, vice president, secretary, treasurer or financial officer, comptroller, principle accounting officer, or any person who does such managerial functions. "Director" refers to an individual who is a member of the board of directors. "Beneficial owner" refers to a large shareholder who owns ten percent or more of a class of registered equity shares in the corporation.

the SEO. The prospectus information enables us not only to get the percentage of ownership for officers and directors as a group but also obtain the total percentage of all of those investors who own five percent or more of the firm (but who are not officers and directors). Thus, whereas previous research focuses largely on just officers and directors as a group, we are able to expand on this by also identifying other large owners who can arguably be considered insiders due to the clout they can exercise such as voting their partisans to the board of directors. To our knowledge, no one has investigated the data and sample we obtained for this paper's tests and thus have not analyzed how the actual change in insider percentages influences stock price behavior either (i) at the time of the announcement of a significant corporate event or (ii) for longer holding periods before and after the announcement.

To carry out our experiment, we first had to obtain a sufficiently large sample of SEOs with prospectuses that have the required insider information. To acquire such a sample, we went to the *Investment Dealers' Digest* where we identified 2,371 seasoned stock (or equity-like) offering announcements from January 1999 through March 2006. For these SEOs, we found that 2,324 had CRSP data. From the latter, we attained prospectuses for 1,597 SEOs. For 721 of those with prospectuses, we were able to find what the insider ownership percentage was before the offering and what it would be after the offering based on those insiders (specified in the prospectus) who were selling or in a few rare cases buying. From this insider ownership data, we were able to determine the exact "change" in the insider ownership percentage caused by the SEO and what the "absolute" level of insider percentage would be after the offering. For these 721 SEOs, we then examined the announcement period market response and, for those with sufficient long-run return data, we also investigated the market behavior for longer holding periods before and after the event date.

For our first tests, we divided our sample of 721 SEOs into portfolios formed according to the "absolute" magnitude of the insider percentage after the SEO. From this division, we found two-day cumulative abnormal returns (CARs) results consistent with the monotonic relationship between insider percentages and two-day CARs, which is a relationship found by prior studies for various corporate events. In particular, our announcement period returns resembled the relationship documented by Hull and Mazachek (2001) for their sample of 455 equity-like offerings from 1979 to 1989. Furthermore, our statistical tests comparing portfolio CARs rendered significant statistics consistent with theories grounded in Myers and Majluf that suggest if SEOs signal overvaluation then those firms with greater levels of insider holdings should signal more negative news.

For our next tests, we divided our sample into portfolios based on the "change" in insider ownership percentages. The two-day CARs for these portfolios did not show a monotonic relationship with the change in insider percentages indicating the market pays no special attention to what insiders are overtly doing. Also, the differences in CARs when comparing portfolios generated insignificant statistics for various comparison tests. These insignificant differences do not support the Leland and Pyle prediction that SEO

announcements by firms with greater decreases in insider ownership percentages will have significantly more negative market responses for the announcement of a negative corporate event. Our announcement period findings indicate that investors are more concerned about the absolute percentage of insider ownership after the announcement compared to changes in these percentages. It appears that if a firm's insiders maintain a relatively high threshold of ownership percentage, then the market on average sees nothing particularly negative when there is a greater decrease in ownership percentages (brought about by insiders selling their current shares and/or not purchasing new shares).

While we lost observations when examining CARs for long holding periods both "before" and "after" the SEOs, we found that all portfolios examined had characteristics very similar to the corresponding portfolios analyzed for our short-run CARs. Like our short-run results, our long-run CARs "before" the announcements showed no relationship to the "change" in insider ownership brought about by the SEO but were related to the "absolute" insider ownership percentage after the announcement. However, the latter relationship was not what we expected. To our surprise, firms with higher absolute percentages performed relatively poorer for long-run holding periods before the SEO announcements.

While the literature (Kahle, 2000; Clarke, Dunbar and Kahle, 2001) has argued that SEOs underperform "after" the offering for various long-run holding periods, recent research (Li and Zhao, 2006) has demonstrated that underperformance disappears if statistical inadequacies are corrected. Our long-run "after" results (like the more recent research) did not indicate SEOs underperform after their announcements as we found long-run CARs that were slightly positive. While there was no monotonic relationship between long-run CARs and the "absolute" percentage of insider ownership, we did find very strong evidence to suggest that long-run stock price performance after the SEO is related to the "change" in insider ownership percentages. However, the nature of the relationship was totally unexpected. Shockingly, firms that underwent greater decreases in insider ownership percentages, performed better after the SEOs and the results were both economically meaningful and statistically significant. In brief, our long-run "after" CARs results challenge the premise of signaling theories such as Myers and Majluf (1984) that assume insiders have enough knowledge to issue equity when their stock is overvalued. It also clashes with the theory of Leland and Pyle (1977) that assumes insiders have superior knowledge and can convey this through changes in their ownership percentages.

What we consider to be shockingly unexpected can be construed as consistent with the recent SEO research of Dittmar and Thakor (2007). They conclude that an ultimate determinant of issuing equity is simply whether or not investors have a high propensity to agree with the managerial decision. Thus, it follows that insiders are not inherently trying to signal anything other than they believe outsiders will not take issue with their decision. However, even if insiders are only behaving based on whether or not investors agree with them, our long-run "after" results still cannot explain the better performance of those firms that have insiders unloading shares in greater proportions.

On the whole, our SEO results defy the very foundation of signaling theory and leave one asking an ultimate question: "*Do seasoned offerings really signal anything significant from insiders?*" And if such a question can be raised in the light of the unique laboratory that SEOs give, then what is to keep one from expanding this question to other corporate events? Future research should conduct tests with a more critical eye as to examining whether or not insiders really have information worth signaling. Even for those who supposedly are in the know, we might ask: "*How easy is it to predict the future when so many unknowns have yet to occur?*"

We organize the remainder of the paper as follows. Section 2 provides background information on our research. Section 3 presents six research hypotheses, while Section 4 gives descriptive statistics. Section 5 provides empirical results for announcement period returns and Section 6 looks at the market behavior for longer holding periods surrounding event dates. Section 7 briefly overviews results of other tests including regression tests. Section 8 gives summary statements.

2. Background

Researchers have investigated the effect of insider ownership on the market's reaction to the announcements of various corporate decisions. These include stock repurchases (Vermaelen, 1981), dividend initiations (Born, 1988), sell-offs (Hirschey and Zaima, 1989), stock splits (Han and Suk, 1998), and equity announcements (Hull and Mazachek, 2001). Han and Suk offer further insight into the role of insider ownership by documenting that the significant relationship between insider ownership and announcement returns is caused by small firms. Hull and Mazachek provide evidence that the influence of firm size in equity offerings is caused by its capacity to proxy for insider ownership.

The security offering research of insider ownership has focused on either the absolute level of insider holdings at the time of the announcement (Hull and Mazachek, 2001) or insider trading before and after the time of the announcement (Copeland and Lee, 1991; Kahle, 2000; Ching, Firth, and Rui, 2006). In some cases, insider "changes" are simply proxied by a variable that reduces mathematically to just the percentage change in outstanding common stock (Cornett and Travlos, 1989; Hull and Mazachek, 2001). While such a variable may at time adequately proxy for insider changes, it essentially assumes all insiders are lowering their proportions by not selling or buying. The most basic cornerstones of signaling theory tests is that insiders have significant knowledge and they can reveal this through actions that the market can decipher and act on. Clarke, Dunbar and Kahle (2001) somewhat question the market's ability to decipher and act on insider signaling. They examine insider trading surrounding SEOs and discover that the market fails to fully capitalize the information in the announcement of the SEO and the contemporaneous insider trading.

Findings of security offering studies are often cited as being consistent with signaling theory originating with Myers and Majluf (1984) and/or Leland and Pyle

(1977).² Regardless of the signaling theory being tested, each assumes that insiders have an information advantage. Concerning this advantage, Myers and Majluf write:

“... managers' information advantage goes beyond having more facts than investors do. Managers also know better what those facts mean for the firm. They have an insider's view of their organization and what it can and cannot do.”

If insiders know more, then they can conceivably make decisions for their advantage such as issuing overvalued securities. For Myers and Majluf, firms should have enough financial slack so that owners will never have to suffer the negative consequences of issuing undervalued equity or even have to issue overvalued equity. Because investors know that a firm with slack and no agency problems does not have to issue overvalued equity, Myers and Majluf write that “*an attempt to issue (equity) sends a strong pessimistic signal.*” It follows that firms with higher “absolute” levels of inside ownership should signal more negative news when they announce a negative corporate event such as an SEO. Hull and Mazachek (2001) use the Myers and Majluf (1984) model but relax their assumptions so as to allow for an equity offering to retire debt and for agency problems to exist between insiders and stockholders. They then proceed to argue that equity offerings that retire debt (like those that expand assets) will signal greater negative news if insider ownership percentages are greater.

The signaling theory of Leland and Pyle focuses on the notion that it is primarily the “change” in insider ownership percentage that influences stock value as opposed to the absolute percentage of the insider ownership. Thus, if markets are efficient and insiders have information not known to the market, then how insiders change their ownership proportions at the time of event should dictate the market's response as opposed to (i) their level of insider ownership at the time of the announcement or (ii) what trading insiders have done surrounding the announced event. To our knowledge, researchers have not examined how actual changes in the percentage of insider ownership influences the announcement period returns for a corporate event, where insiders are simultaneously changing their ownership percentages at the time of the actual event. Thus, an examination of the “change” in insider ownership percentage at the time of a corporate event is a missing gap in the insider signaling research that this paper attempts to address.

Besides the insider signaling research, this study covers the seasoned offering (SEO) research. SEOs provide an ideal “laboratory” to test signaling theories premised on

² While we appear to be fixated throughout this paper on signaling represented by Myers and Majluf (1984) and Leland and Pyle (1977), we acknowledge there are other signaling theories not only within the disciplines of finance and economics but also many other disciplines. While the “other signaling theories” are too numerous to mention, in general they speak to the tests that this paper tackle. We might note that one of these “other signaling theories” argues that communication through signals ought to be viewed as an “evolutionary arms race” in which signalers evolve to become better at manipulating receivers, while receivers evolve to become more resistant to manipulation. Thus, managers-insiders might be seen as evolving based on their ability to get investors-outsiders to believe the best about the company, while investors-outsiders evolve to recognize the nature of the signaling and not be fooled into being too pessimistic or too optimistic.

superior insider knowledge since prospectuses can reveal the amount of insider selling (and in rare cases buying) that will accompany the new offering. The SEO line of research has its origins in a number of early empirical studies (Masulis, 1983; Asquith and Mullins, 1986) that document negative announcement period returns. Regardless of the purpose of the offering, the general consensus is that the negative news is being signaled about the stock being overvalued. If this is the case, then more negative news should be signaled if insiders are lowering their ownership percentages. Hull and Mazachek (2001) looked at the amount of insider ownership at the time of the SEO announcement. They find that greater levels of insider ownership are associated with greater negative announcement period returns for common stock and other equity-like offerings. While they attempt to test changes in inside ownership through looking at the percentage change in equity, their study fails to take into account information in prospectuses about insider selling and buying of the offered shares.

While the Myers and Majluf (1984) theory is premised on a firm issuing stock to undertake a valuable investment, the Hull and Mazachek (2001) analysis is confined to SEOs that reduce debt and such a purpose may evoke a negative response of a different strength than other purposes. For example, smaller negative announcement period returns are consistent with the asymmetric information signaling models based in Miller and Rock (1985) and Brennan and Kraus (1987). These models predict less negative returns when part of the cash proceeds from an equity offering is used to retire debt. If so, non-debt related purposes should evoke a greater negative response. One exception is the retirement of bank debt as both theory (Bernanke, 1983) and empirical findings (Hull and Moellenberndt, 1994) suggest bank debt reductions elicit a more negative market response than nonbank debt reductions. In regards to the strength of the market response to an SEO announcement, explanations for a greater negative response can include other reasons besides greater "absolute" insider percentages or greater "changes" in insider percentages. These reasons can include greater issue costs (Hull and Kerchner, 1996), smaller firm sizes (Bhushan, 1989), and greater net negative agency costs (Jensen and Meckling, 1976; Jensen, 1986). While addressing these reasons in regression tests, the major focal points of this paper's tests are the Leland and Pyle theory and how it fares relative to signaling theories (identified with the Myers and Majluf school of thought) that speak more to the absolute ownership percentage around the time of the corporate announcement. This is all done while expanding on both the SEO announcement period research and the SEO long-run return research.

3. Six Hypotheses

The foundation of signaling theory is inseparable from tenets of human cognition and behavior. Below we attempt to describe five key cognitive and behavioral tenets crucial to the process of properly understanding, examining and testing signaling theory.

(*T-1*) Insiders have wealth-enhancing information that can be revealed to outsiders through insider behavior.³

(*T-2*) Outsiders believe insider behavior is self-serving and aimed at optimizing insider wealth.

(*T-3*) Outsiders understand and act on the information conveyed through insider behavior.

(*T-4*) Outsiders' response to an insider behavior will increase according to how many insiders (as measured by the absolute insider ownership percentage) can potentially profit.

(*T-5*) Outsiders' reaction to an insider corporate decision will increase in proportion to how many insiders are overtly involved (as measured by the change in the absolute insider ownership percentage).

The first three tenets (*T-1*, *T-2* and *T-3*) are prerequisites that must hold for signaling tests of the market response to have credibility. The last two tenets (*T-4* and *T-5*) are the logical consequences of *T-1*, *T-2* and *T-3*. These three tenets, along with the Myers and Majluf (1984) assumption about overvaluation equity offerings, generate the research hypotheses that this paper attempts to examine. *T-4* holds that the "absolute" insider ownership percentage determines the amount of wealth that insiders stand to gain through their decisions as well as the strength of the market response. *T-5* posits that the "change" in the absolute insider ownership percentage accompanying a self-serving corporate decision represents a more overt attempt by insiders to optimize their wealth and the market will respond accordingly. If empirical evidence cannot be offered to support *T-4* and *T-5* then the foundation of signaling theory represented by *T-1*, *T-2* and *T-3* can arguably be flawed given that *T-4* and *T-5* should be their logical consequences.

3.1. Test of the Myers and Majluf implications for signaling around the time of SEOs

While insiders are more reluctant to issue an undervalued SEO if their ownership percentages are greater, they are more willing to issue overvalued equity as they stand to gain more when their ownership percentages are greater. If the market believes that SEOs are undertaken when equity is overvalued, signaling theory rooted in as Myers and Majluf suggests that firms with greater insider percentages signal more negative value when they undergo SEOs. In terms of our expectations about the market's reaction to SEOs based on the just the absolute percentage of insider ownership, we formulate three research hypotheses to predict how the market will behave not only "at the time of" of an SEO announcement but also "before" and "after" the announcement.⁴ These hypotheses are described below.

³ Insider behavior includes personal, fiduciary or corporate decisions/actions that impact firm value.

⁴ Each research hypothesis we test is written in terms of null and alternative hypotheses with the alternative representing our research hypothesis or what we suspect to be true. If we can reject the null, we can offer indirect evidence to support our expectations about the relationship between CARs and insider ownership.

Research Hypothesis One (H-1): Stock returns “at the time” of an SEO announcement will be inferior for firms with greater percentages of insider ownership.⁵ For *H-1*, we have:

Null: $CAR_{\text{Portfolio with Greater Percentages}} \geq CAR_{\text{Portfolio with Lesser Percentages}}$

Alternative: $CAR_{\text{Portfolio with Greater Percentages}} < CAR_{\text{Portfolio with Lesser Percentages}}$

Research Hypothesis Two (H-2): Stock returns “before” an SEO announcement will be superior for firms with greater percentages of insider ownership. For *H-2*, we have:

Null: $CAR_{\text{Portfolio with Greater Percentages}} \leq CAR_{\text{Portfolio with Lesser Percentages}}$

Alternative: $CAR_{\text{Portfolio with Greater Percentages}} > CAR_{\text{Portfolio with Lesser Percentages}}$

Research Hypothesis Three (H-3): Stock returns “after” an SEO announcement will be inferior for firms with greater percentages of insider ownership. For *H-3*, we have:

Null: $CAR_{\text{Portfolio with Greater Percentages}} \geq CAR_{\text{Portfolio with Lesser Percentages}}$

Alternative: $CAR_{\text{Portfolio with Greater Percentages}} < CAR_{\text{Portfolio with Lesser Percentages}}$

We reject the null for *H-1* and *H-3* if the CARs for the portfolio with greater insider percentages are inferior to the CARs for the portfolio with lesser insider percentages, where inferior is given by “<” as seen in the alternative for *H-1* and *H-3*. For *H-2*, we reject the null if the CARs for the portfolio with greater insider percentages are superior as given by “>” in the alternative for *H-2*. Rejecting any of the three null hypotheses offers roundabout evidence that the research hypothesis best describes how the market behaves given the “absolute” percentage of insider ownership at the time of an SEO.

H-1, *H-2* and *H-3* are interrelated as they stem from the same general notion that firms with greater insider ownership have more to gain from issuing equity that is overvalued. *H-2* is formulated as a consequence of both *H-1* and *H-3* that test whether insiders with more to gain will signal greater negative news when they issue an overvalued security. Consequently, *H-2* examines if greater overvaluation implies the likelihood that there has been a greater price run-up. One way of measuring the stock price run-up for firms with greater insider percentages (and thus testing *H-2*) is to compare its risk-adjusted price run-up relative to those with lesser insider percentages.

While *H-1* and *H-3* have similar predictions, there is a difference between what each focuses on. The difference is that *H-1* concentrates on investors’ fears that insiders behave to achieve instant wealth (even if insiders are really unsure of what the future holds). On the other hand, *H-3* is not concerned with instant wealth but focuses on the long-run consequence of any negative signaling tied to the amount of insider holdings. If

⁵ Inferior means “more negative” or “less positive” depending on our expectations about returns; similarly, superior means “less negative” or “more positive.” For example, because we expect negative CARs on the announcement of all SEOs, inferior in *H-1* implies CARs for firms with greater ownership percentages are expected to be more negative than CARs for firms with lesser percentages.

insiders are simply motivated to attain instant wealth and/or diversify their portfolios through an SEO and not signal negative news, then any poor long-run performance should not necessarily be related to the amount of the insider ownership percentage. However, even if the instant wealth and/or diversification notions hold, it still would not explain why insiders would lower their ownership percentages if they believe that future earnings would be positive so as to significantly enhance shareholder wealth.

3.2. Test of the Leland and Pyle implications for signaling around the time of SEOs

Besides the percentage of insider holdings at the time of an SEO announcement, signaling theory based in Leland and Pyle predicts that greater decreases in insider holdings signal more negative news. If insiders are privy to information not known to outsiders, then lowering their ownership percentages signal negative news. The more insiders lower their percentages then the greater the negative signaling. In terms of expectations about the market performance and response to SEOs based on the “change” in the percentage of insider ownership, we generate three research hypotheses to predict how the market will behave “at the time of” of an SEO announcement, “before” the announcement, and “after” the announcement. These hypotheses are described below.

Research Hypothesis Four (H-4): Stock returns “at the time” of an SEO announcement will be inferior for firms with greater decreases in insider percentages caused by the issuance. For *H-4*, we have:

Null: $CAR_{\text{Portfolio with Greater Decreases}} \geq CAR_{\text{Portfolio with Lesser Decreases}}$

Alternative: $CAR_{\text{Portfolio with Greater Decreases}} < CAR_{\text{Portfolio with Lesser Decreases}}$

Research Hypothesis Five (H-5): Stock returns “before” an SEO announcement will be superior for firms with greater decreases in insider percentages caused by the issuance. For *H-5*, we have:

Null: $CAR_{\text{Portfolio with Greater Decreases}} \leq CAR_{\text{Portfolio with Lesser Decreases}}$

Alternative: $CAR_{\text{Portfolio with Greater Decreases}} > CAR_{\text{Portfolio with Lesser Decreases}}$

Research Hypothesis Six (H-6): Stock returns “after” an SEO announcement will be inferior for firms with greater decreases in insider percentages caused by the issuance. For *H-6*, we have:

Null: $CAR_{\text{Portfolio with Greater Decreases}} \geq CAR_{\text{Portfolio with Lesser Decreases}}$

Alternative: $CAR_{\text{Portfolio with Greater Decreases}} < CAR_{\text{Portfolio with Lesser Decreases}}$

We reject the null for *H-4* and *H-6* if CARs for the portfolio with greater decreases in insider percentages are inferior to the CARs for the portfolio with lesser decreases in insider percentages. For *H-2*, we reject the null if the CARs for the portfolio with greater decreases in insider percentages are superior. Rejecting any of the three null hypotheses offers roundabout evidence that the research hypothesis best discloses the true nature of how the market behaves based on the “change” in the percentage of insider ownership

caused by an SEO.

As was true for the first three hypotheses, the last three hypotheses are also interrelated. The major difference is that *H-4*, *H-5* and *H-6* (as opposed to *H-1*, *H-2* and *H-3*) focus on the “change” in insider percentages. Since firms with greater insider percentages may not be the same firms that are undergoing the greater “changes,” the two sets of three hypotheses can be seen as a test between signaling theories identified more with Myers and Majluf (*H-1*, *H-2* and *H-3*) versus those classified more with Leland and Pyle (*H-4*, *H-5* and *H-6*). In essence, the question is:

“Will the market response be determined more by the percentage that remains after the announcement or by the “change” in the percentage that occurs as a result of the SEO?”

Additionally, the six research hypotheses are also a test of the very foundation of signaling theory captured by *T-1*, *T-2* and *T-3*. Succinctly expressed this foundation is:

“Insiders know more than others and will act to use this knowledge to their advantage thereby generating signals to guide outsider behavior.”

It is only when we test *H-3* and *H-6* that we can best examine this foundation because the aftermarket performance reveals if negative insider signaling stands the test of time. *H-6* arguably offers a more powerful test as to the ability of insiders to predict the future. For example, if there are positive (and relatively superior) performances after the SEOs for firms with greater decreases in insider percentages then we are left to conclude that insiders lack the capacity to know and convey information through an SEO. While this would cast doubt on the validity of signaling theory’s foundation, it might not be surprising to those who prudently understand that the future is hard to predict even if those “in the know” believe they can.

4. Descriptive Statistics

We identify SEO announcement dates from the *Investment Dealers' Digest* for seven years and three months from January 1999 through March 2006. We gather insider ownership data from prospectuses filed with the Securities and Exchange Commission (SEC) as part of registration statements. Information gathered from prospectuses include the offer price, number of shares being offered (both primary shares and, if applicable, secondary shares), purpose of the offering, number of post-outstanding shares, and issue costs. Other sources used for descriptive data and empirical tests include *Compustat Annual Files* and CRSP Daily Return Files.

We utilize the *OLS* market model procedure described by Brown and Warner (1985) to calculate abnormal cumulative returns (CARs) for various time periods. When applying this model, we compute alpha and beta parameters using CRSP NASDAQ, AMEX, and NYSE index (or “NAN” index for short). We keep with the current conventions of using the equal-weighted index for short-run CAR computations and the value-weighted index for long-run CAR calculations. The comparison period to compute

the parameters includes from three years before to three years after the announcement day (day 0).⁶ For those stocks for which we do not have the full six years of data, we use whatever data is available. The average firm had trading data for nearly five years with the minimum being 14 months. We adjust the Brown and Warner methodology by compounding abnormal returns instead of just adding them. In the short-run such an adjustment makes no real difference. However, for long-run cumulative results, the compounding of returns is needed to get proper holding period results and mimic what investors would earn by buying at a point in time and selling at some future date. Long-run cumulative returns are computed by compounding monthly abnormal returns.

For inclusion in our sample for empirical tests, an observation must satisfy the following five screens. First, it must be a seasoned offering that involves issuing either common shares or shares identified as akin to common shares through residual claims.⁷ Second, it must be announced in the *Investment Dealers Digest*. This screen typically eliminates the smallest of firms. Third, we must be able to obtain its prospectus. Fourth, the prospectus must have insider ownership percentage data before and after the announcement. This screen biases the sample towards smaller firms who tend to have larger insider holdings and thus are more apt to have changes in insider holdings that need to be reported in the prospectus. The insider ownership data given in the prospectus include the (i) combined percentage holdings of all officers and directors and (ii) the percentage holdings of all beneficial owners who own and control at least five percent of the outstanding shares. We use the five percent number as our cut-off because that is the "magic" number specifically mentioned in prospectuses when describing the principal owners who have enough control to impact firm decisions. The five percent cutoff identifies any principal holder who owns at least five percent of the outstanding shares (i) by himself or herself, (ii) through other family members, or (iii) via other entities or companies. The proportion of insider ownership may not always represent the same proportion of both voting power and dividends received. If that is the case, we try to determine the power associated with the ownership by estimating the average of the two.

⁶ There have been some disagreements among researchers since the birth of event studies as to what methodologies to use with opinions changing over time making one suspicious of the current accepted procedure. Thus, we tested a variety of methods and comparison periods. Our reported results were generally invariant as to methods and comparison periods used. For example, our findings are not altered based on the type of weight (equal or value) used or the index (NAN or exchange-based) employed. Simply adjusting raw returns for its exchange-based index (e.g., the one that corresponds to whether the firm is NASDAQ, AMEX, or NYSE) return give similar CAR results.

⁷ Equity shares akin to common shares that are in our initial sample of 721 observations used for announcement period tests include 12 ADRs, 5 units, and 9 REITs. While many studies automatically delete such observations, we include them because their deletions do not change our results. Similarly, deleting the 36 utilities and 47 financials that make up 4.99% and 6.52% percent of our samples tested) do not change our results. The major reason our results are invariant to such deletions is that the above observation types tend to be found in similar proportions in the portfolios we compare to test insider signaling. Finally, dummy variables to capture share and industry types are not significant when tested in regression analysis with other independent variables.

Table 1
Descriptive statistics

This table reports descriptive statistics for 721 seasoned offerings (SEOs). M represents millions. Insider ownership refers to (i) all officers and directors as a group and (ii) other beneficial owners who each own five percent or more of the firm's outstanding shares. The "Change in Percentage of Insider Ownership" is "Percentage of Insider Ownership *After* SEO" minus "Percentage of Insider Ownership *Before* SEO." Except for 13 observations where there was no change or an actual increase, all other values for "Change in Percentage of Insider Ownership" are negative. "Firm Value" includes the "Common Value" variable, the liquidation value of preferred stock (if applicable), and the book value of long-term debt obligations and current liabilities. CAR stands for cumulative abnormal returns. Issuance expenses include only the expenses reported in the prospectus and thus exclude other expenses such as underpricing, warrants given to underwriters, revenue lost from underwriters selling over-allotted shares below market, employee's time, and so forth.

<i>Time Periods</i>	Number of Observation	Percent of Total	
1999-2000	295	40.9%	
2001-2002	183	25.4%	
2003-2006	243	33.7%	

<i>Key Variables</i>	Mean	Median	Range
Percentage of Insider Ownership <i>Before</i> SEO	48.92%	46.20%	1.30% – 100.0%
Percentage of Insider Ownership <i>After</i> SEO	38.37%	34.20%	0.00% – 100.0%
Change in the Percentage of Insider Ownership	-10.55%	-9.00%	-42.00% – +7.75%
Total Shares Offered (Primary + Secondary)	6.800M	4.264M	0.550M – 135.1M
Secondary Shares as Percentage of Total Shares	39.20%	24.80%	0.00% – 100.0%
Offer Value (Offer Price × Total Shares Offered)	213.55M	112.00M	5.00M – 8,782M
Common Value (Price Day -1 × Outstanding Shares)	2,182.2M	727.7M	27.40M – 46,134M
Offer Value as Percentage of Common Value	16.11%	14.52%	0.28% – 222.89%
Firm Value	5,466.5M	1,042.9M	31.0M – 340,121M
Issuance Expenses as Percentage of Offer Value	5.72%	5.67%	0.28% – 23.30%
Issuance Expenses as Percentage of Common Value	0.97%	0.82%	0.01% – 6.83%
Two-Day CAR (Days -1, 0)	-1.70%	-1.54%	-38.13% – +39.39%
Three-Day CAR (Days -1, 0, +1)	-1.14%	-1.53%	-46.92% – +45.94%
Eleven-Day CAR (Days -5 to +5)	-1.75%	-2.73%	-76.43% – +106.37%
Twenty-One-Day CAR (Days -10 to +10)	-0.56%	-2.46%	-73.01% – +103.82%
Three-Year "Before" CAR (n = 456)	126.47%	77.18%	-87.91 – +1065.03%
Two-Year "Before" CAR (n = 514)	145.98%	74.78%	-79.04% – +2874.10%
One-Year "Before" CAR (n = 593)	108.83%	53.84%	-63.11% – +1485.29%
Event-Month CAR (n = 721)	0.87%	-1.01%	-68.28% – +139.95%
One-Year "After" CAR (n = 700)	0.53%	-8.99%	-96.13% – +613.91%
Two-Year "After" CAR (n = 615)	1.39%	-11.89%	-98.93% – +971.47%
Three-Year "After" CAR (n = 473)	6.06%	-16.55%	-98.55% – +933.73%

For some prospectuses that have many owners including those with ownership through various entities, it can become a difficult task trying to determine the actual “before” and “after” percentages. Fifth, each observation must have available stock return data on CRSP to compute at least the announcement period abnormal return. While some tests require other data, observations without the required data are lost for these tests.

After applying these screens, we have 721 SEOs. Table 1 provides descriptive statistics for the sample of 721 SEOs. The “*Time Periods*” statistics at the top of Table 1 reveal that 40.9% of the observations occurred in 1999-2000. The large number of observations for these two years can be explained by the fact that the stock market was peaking during this time and SEOs tend to be issued during bull markets when equity financing is relatively cheaper, which can imply the stock has a good chance of being overvalued.

Table 1 next reports “*Key Variables*” statistics. The mean (median) insider ownership percentage before the announcement is 48.92% (46.20%), while the mean (median) percentage after the offering is 38.37% (34.20%). The mean (median) change in the percentage of insider ownership is -10.55% (-9.00%) indicating that a typical firm’s insiders decrease their percentage ownership by about ten percent. However, relative to what is outstanding before the offering, the decrease is -22.79%. Thus, insiders are on average losing slightly over one of every five outstanding shares held. Another statistic from Table 1 deserving emphasis is the number of shares sold by current owners (where these can also include insiders). The mean (median) for this statistic is 39.20% (24.80%). Thus, on average nearly two shares of every five shares sold are from a current owner. The mean (median) percentage change in common stock value is 16.11% (14.52%) indicating that the SEO sells, on average, about one share for every 6.21 shares outstanding at the time of the equity announcement.

Table 1 also reports issuance expenses data as given in the prospectus with about 90% of the expenses attributed to what the prospectus describes as the “underwriting discount.” These prospectus-reported expenses should not be considered inclusive of all possible costs related to a new issue. For example, the prospectus does not account for issue-related expenses such as underpricing, warrants given as perks to underwriters, potential lost revenue from underwriters exercising overallotment options at prices below the market, and other miscellaneous expenses (like employees’ time). Prior research (Hull and Kerchner, 1996) documents that underpricing alone can range from one-half to two-thirds of the expenses reported in the prospectus. The OTC research (Hull and Fortin, 1994) suggests that all other “non-reported” expenses can equal that reported in the prospectus. Given this research, it appears that issuance expenses given in Table 1 (which is 0.97% of common stock value) can explain much of the fall in stock value as given by various CARs ranging from two-days (days -1 and 0) to twenty-one days (days -10 to +10). The smallest CAR of -0.56% occurs for twenty-one days and the largest CAR of -1.75% occurs for eleven days (days -5 to +5). For the two-day CAR, which is the CAR commonly used in announcement period event studies, the mean (median)

return is -1.70% (-1.53%).⁸

Finally, as seen in Table 1, the typical firm experiences positive returns prior to its SEO as the respective three-year “before,” two-year “before” and one-year “before” CARs are 126.47%, 145.98% and 108.83%. These returns would be even more positive were we not adjusting for the high expected return caused largely by the high positive market returns that occur for many of our sample firms. For example, the mean raw returns are 201.78%, 192.83% and 135.23% for the three years before, two years before and one year before, respectively. If we look at the NAN market returns (and keep only those observations with return data) we get mean CARs of +35.35%, +19.75% and +9.28% for the three respective periods of three, two and one years before. Consistent with prior research for SEOs, most of the run-up in stock value for our SEOs occurs for the year just prior to the offering announcement. For the years after SEO announcements, the mean raw cumulative abnormal returns (like the mean cumulative abnormal returns reported in Table 1) are all positive and small. We conclude that our long-run returns are consistent with previous research as (i) the “before” returns are positive enough to verify prior findings that stock offerings tend to occur when stock prices are performing well and assumedly overpriced, and (ii) the “after” returns are like the recent research (Li and Zhao, 2006) that shows SEOs do not generate negative average holding period returns.

5. Short-Run Return Results

Table 2 reports short-run results using two-day cumulative abnormal returns (CARs) where the two days are days -1 to 0. Panel A gives CAR results when three portfolios are formed according to the “absolute” percentage of insider ownership that exists after the SEO.⁹ Panel B provides results when three portfolios are based on the “change in the percentage of insider ownership. Thus, Panel A enables us to form tests for H-1 as suggested by signaling theory premised in Myers and Majluf (1984) and Panel B allows for tests of H-4 as directly predicted by Leland and Pyle (1977).

As seen in Panel A in Table 2, Portfolio 1 includes firms with the least insider ownership percentages after the SEO announcement while Portfolios 2 and 3 consist of firms with the middle and greatest insider ownership percentages, respectively. The first three rows of results in Panel A reveal that the insider percentages for Portfolios 1, 2 and 3 are 16.27%, 34.77% and 64.23%, respectively. The corresponding CARs for these three portfolios are -0.83%, -1.56% and -2.71% with *t*-statistics in the last column of the first three rows increasing in significance as predicted by signaling theory that we identify as being rooted in the Myers and Majluf (1984). The results in Panel A are like prior event study research in that the market response changes monotonically with the change in

⁸ The average two-day CAR is a bit lower than reported by prior research and lower than what we find for a four-day that includes days -3, -2, -1 and 0. For these four days, the CAR is -2.90% and more in line with prior research.

⁹ While we report results using absolute insider ownership percentages that exist “after” the offering, results are similar if we take the insider percentages “before” the SEOs.

insider ownership levels. In particular, our CARs parallel those by Hull and Mazachek (2001) who used a period covering the 1980s and thus ten years removed from the beginning of our period.

The remaining four rows of results in Panel A report statistical results when comparing portfolio two-day CARs. These results support the observations generated from the first three rows. The analysis of variance results report an F -statistic of 3.46, which is significant at the five percent level revealing that CARs are significantly different across portfolios. The last three rows of Panel A report nonpaired one-tailed parametric t -statistics when testing the null that the CAR for a portfolio with the greater insider ownership percentages is equal or less negative compared to the CAR for a portfolio with lesser insider ownership percentages. The comparisons between any two portfolios are consistent with the Myers and Majluf beliefs that (i) an equity offering implies overvaluation to investors and (ii) managers-insiders have superior information about firm wealth with the latter belief implying that greater insider ownership gives a stronger market response. As seen in the last row of Panel A, the comparison between Portfolios 1 and 3 yield a t -statistics of -2.56 that is significant at the one percent level in rejecting the null given by $H-1$. Consistent with $H-1$, these two portfolios (with the greatest differences in insider ownership percentages) yield the most significant t -statistic when comparing sets of portfolios. As a whole the results in Panel A render solid support for the research hypothesis given by $H-1$ that states: *Stock returns "at the time" of an SEO announcement will be inferior for firms with greater percentages of insider ownership.*

Having duplicated prior research by focusing on the absolute percentage of insider ownership, we now turn our attention into analyzing the change in insider ownership to determine whether two-day CARs are more negative for firms with greater decreases in insider ownership percentages. This according to signaling theory based in Leland and Pyle (1977) should arguably be even a more decisive determinant of the market responses relative to the absolute percentage of ownership. Thus, we proceed by partitioning our SEO sample into three portfolios based on changes in insider ownership percentages. Portfolio 1 includes firms with the least negative decreases in insider ownership percentages while Portfolios 2 and 3 consist of firms with the middle and greatest negative decreases in insider ownership percentages, respectively.

Panel B in Table 2 gives results that do not support the research hypothesis given in $H-4$ that states: *Stock returns "at the time" of an SEO announcement will be inferior for firms with greater decreases in insider percentages caused by the issuance.* Inconsistent with $H-2$ and signaling theories stemming from Leland and Pyle (1977), the first three rows of results reveal that two-day CARs do not decrease monotonically with the decrease in insider ownership percentages. The least negative CAR is -1.25% ($t = -2.40$) for Portfolio 2 where the decreases in insider ownership percentages range from -12.40% to -5.80%. For Portfolio 1, the CAR is the second most negative at -1.90% ($t = -3.59$) even though the change in insider ownership percentage ranges from -5.70% to

Table 2
Short-run return results for SEO announcements

This table reports two-day cumulative abnormal return (CAR) results for the sample of 721 seasoned offerings (SEOs). Panel A reports results when the sample is divided into three portfolios formed according to the “absolute” percentage of insider ownership that the prospectus gives as existing after the SEO is completed. Portfolio 1 contains firms with the least insider ownership percentages, while Portfolios 2 and 3 include firms with the middle and greatest percentages, respectively. The first three rows of results in Panel A report statistics for the insider ownership percentages and two-day CARs. The last column for these three rows gives the *t*-statistics (with two-tailed significance levels) when testing if the portfolio two-day CAR is equal to zero. The fourth row of results in Panel A reports analysis of variance (*F*-statistic) findings when testing the null that CARs are equal across portfolios. The last three rows give nonpaired one-tailed parametric *t*-statistic results when testing the null that CARs for the portfolio with the greater insider ownership percentages is equal to or less negative compare to CARs for the portfolio with the lesser percentages. Panel B reports results when the three portfolios are formed according to the “change” in the percentage of insider ownership. Portfolio 1 contains firms with the least decreases in insider ownership percentages. Portfolios 2 and 3 include firms with the middle and greatest decreases in insider ownership percentages, respectively. Panel B reports the same statistics given in Panel A except the *t*-statistics in the last three rows now test the null that CARs for the portfolio with the greater decreases in insider ownership percentages is equal to or less negative compared to CARs for the portfolio with lesser decreases in insider ownership percentages. The symbols *, **, and *** indicate statistical significance at the ten percent, five percent, and one percent levels, respectively.

Panel A. Results when sample partitioned based on “absolute” level of insider ownership percentage			
<i>Portfolios</i>	<i>Mean (Range) for Insider Percentage after Offering</i>	<i>Mean (Range) for Two-Day CARs</i>	<i>Statistic for H₀: CARs = 0</i>
Portfolio 1 (n = 240)	16.27% (0% – 26.10%)	-0.83% (-23.62% – +30.92%)	<i>t</i> = -1.67*
Portfolio 2 (n = 241)	34.77% (26.20% – 45.80%)	-1.56% (-24.23% – +26.20%)	<i>t</i> = -3.17***
Portfolio 3 (n = 240)	64.23% (45.90% – 100.00%)	-2.71% (-38.13% – +39.39%)	<i>t</i> = -5.06***
<i>Portfolios Compared</i>	<i>Statistic for H₀: Portfolio CAR_{Portfolio 3} = CAR_{Portfolio 2} = CAR_{Portfolio 1}</i>		
Portfolios 1, 2, 3	<i>F</i> = 3.46**		
<i>Portfolios Compared</i>	<i>Statistic for H₀: Portfolio CAR_{Portfolio 3} ≥ CAR_{Portfolio 2} ≥ CAR_{Portfolio 1}</i>		
Portfolios 1 and 2	<i>t</i> = -1.04		
Portfolios 2 and 3	<i>t</i> = -1.58*		
Portfolios 1 and 3	<i>t</i> = -2.56***		
Panel B. Results when sample partitioned based on “change” in insider ownership percentage			
<i>Portfolios</i>	<i>Mean (Range) Change in Insider Percentage from Offering</i>	<i>Mean (Range) for Two-Day CARs</i>	<i>Statistic for H₀: CARs = 0</i>
Portfolio 1 (n = 240)	-2.94% (-5.70% – +7.75%)	-1.90% (-38.13% – +30.92%)	<i>t</i> = -3.59***
Portfolio 2 (n = 241)	-8.97% (-12.40% – -5.80%)	-1.25% (-29.84% – +39.39%)	<i>t</i> = -2.40**
Portfolio 3 (n = 240)	-19.75% (-42.00% – -12.50%)	-1.95% (-23.39% – +25.65%)	<i>t</i> = -4.06***
<i>Portfolios Compared</i>	<i>Statistic for H₀: Portfolio CAR_{Portfolio 3} = CAR_{Portfolio 2} = CAR_{Portfolio 1}</i>		
Portfolios 1, 2, 3	<i>F</i> = 0.58		
<i>Portfolios Compared</i>	<i>Statistic for H₀: Portfolio CAR_{Portfolio 3} ≥ CAR_{Portfolio 2} ≥ CAR_{Portfolio 1}</i>		
Portfolios 1 and 2	<i>t</i> = 0.98		
Portfolios 2 and 3	<i>t</i> = -0.87		
Portfolios 1 and 3	<i>t</i> = -0.08		

+7.75%. For Portfolio 3, the CAR of -1.95% ($t = -4.06$) is similar to the CAR for Portfolio 1 even though the changes in insider ownership percentages range all the way from -42.00% to -12.50%. In conclusion, the respective means for the change in insider ownership percentages of -2.94%, -8.97%, and -19.75% for Portfolios 1, 2, and 3 do not render two-day CAR results predicted by Leland and Pyle.

The remaining four rows of results in Panel B reports statistics when comparing portfolio two-day CARs and confirm the conclusion generated from the first three rows. The analysis of variance results gives an F -statistic of only 0.58 revealing that CARs are not significantly different across portfolios. The last three rows report nonpaired one-tailed parametric t -statistics when testing the null that the CAR for the portfolio with the greater decreases in insider ownership percentages is equal or superior compared to the CAR for the portfolio with lesser decreases in insider ownership percentages. The t -statistics are all rather anemic providing no support for the research hypothesis embodied in H-4.

Throughout Panel B, we find persistent evidence that the wealth effects do not differ across firms with dissimilar changes in insider ownership percentages. Inconsistent with H-4 and Leland and Pyle, SEO announcement period returns by companies with greater decreases in insider ownership percentages are not associated with greater negative returns. Thus, managers and investors in firms undergoing SEOs cannot expect a more negative market response as the insider ownership percentages decreases. What they can expect (as shown in Panel A) is that the market will consider the absolute percentage of insider ownership and base insider signaling on this percentage. Thus, for our first round of tests (H-1 and H-4), we discover support only for signaling theories that we identify with the Myers and Majluf (1984) school of thought where an overvalued equity would increase negative signaling based on the absolute percentage of insider ownership. We find no support for the Leland and Pyle (1977) theory that would emphasize signaling is tied to changes in ownership percentages.

6. Long-Run Return Results

We now seek to determine if the long-run market reaction is more related to the “absolute” insider ownership percentage or the “changes” in the insider ownership percentage. In examining long-run returns around the offering, we encounter a problem stemming from sample size dilution due to the fact trading data is not complete for longer periods.¹⁰ While we tested various periods ranging from one year to three years, we settled on a two-year period “before” and a two-year period “after” for testing purposes. This permits us to keep most of our 721 observations while still allowing us to cover a

¹⁰ Four major reasons exist to explain the reduced sample sizes. First, some firms may not be listed on CRSP for longer periods. Second, an observation may have had its IPO within three years of the SEO's event day. Third, firms go out of existence for various reasons such as mergers. Fourth, for our firms that occur later in our sample period (that goes through March 2006), full data does not yet exist at the time of this writing.

four-year period surrounding the announcement date.

As was done for short-run announcement period results in Table 2, the long-run results in Tables 3 and 4 will first focus on “absolute” insider percentages in Panel A and then on the “change” in insider percentages in Panel B. Table 3 examines the relationship between insider percentage changes and cumulative returns for the two-year period “before” the event month, while Table 4 investigates the relationship “after” the event month. As can be seen from comparing the insider data in Table 2 with Tables 3 and 4, the reduction in sample sizes has no noteworthy effect as the insider ownership statistics when the sample is divided into portfolios. In fact, the insider ownership statistics for the portfolios with reduced observations are remarkably similar to their corresponding portfolios with full number of observations.¹¹

6.1. Long-run return results “before” the SEO announcements

Table 3 provides mean two-year cumulative abnormal returns (CARs) for years -1 and -2 “before” the event month. As before Panel A reports results when the sample is divided into three portfolios based on the “absolute” percentage of insider ownership, while Panel B gives results when the sample is divided into portfolios based on the “change” in the insider percentage.

The first three rows in Panel A reveal that the respective two-year “before” CARs for Portfolios 1, 2 and 3 are 161.4%, 145.7% and 121.7%. As seen in the last column these CARs are all significant at the one percent level. While the results do show a monotonic relationship between the level of insider ownership and the stock price run-up prior to the SEO, this relationship is just the opposite of that predicted by the research hypothesis for *H-2* that states: *Stock returns “before” an SEO announcement will be superior for firms with greater percentages of insider ownership*. Thus, there is no evidence from the first three rows of Panel A to support any notion that firms with greater insider holdings will unload more shares after the offering due to the stock value being relatively more overvalued due to greater performance. This is a bit surprising since firms with greater insider holdings have more to lose if the stock price run-up creates overvaluation and so we would expect them to be more anxious to lower their holdings.

The last three rows of Panel A in Table 3 report nonpaired one-tailed parametric *t*-statistics results when testing the null that two-year “before” CARs for the portfolio with the greater insider ownership percentages is equal to or less positive compared to CARs for the portfolio with the lesser percentages. All comparisons between any two portfolios have signs that are the opposite of that predicted by our research hypothesis given in *H-2*. While it is logical to assume that insiders may be selling for reasons such as diversification

¹¹ To illustrate consider Portfolio 3, which is the portfolio that loses more observations. Panel A of Table 3 reports that the mean insider ownership percentage after the offering is 62.51% for Portfolio 3 and this is very close to the 64.23% mean reported in Panel A of Table 2 after this same portfolio loses 45.83% of its observations. The average long-run sample tested loses 22.44% of its observations.

Table 3
Long-run return results for “before” SEO announcements

This table reports two-year “before” cumulative abnormal return (CAR) results. Panel A reports results when the sample is divided into three portfolios formed according to the percentage of insider ownership that the prospectus gives as existing after the SEO is completed. Portfolio 1 contains firms with the least insider ownership percentages, while Portfolios 2 and 3 include firms with the middle and greatest percentages, respectively. The first three rows of results in Panel A report statistics for the insider ownership percentages and two-year CARs. The last column for these three rows gives the *t*-statistics (with two-tailed significance levels) when testing if the portfolio two-year “before” CAR is equal to zero. The fourth row of results in Panel B reports analysis of variance (*F*-statistic) findings when testing the null that CARs are equal across portfolios. The last three rows give nonpaired one-tailed parametric *t*-statistic results when testing the null that CARs for the portfolio with the greater insider ownership percentages is equal to or less positive compared to CARs for the portfolio with the lesser percentages. Panel B reports results when the three portfolios are formed according to the change in the percentage of insider ownership. Portfolio 1 contains firms with the least decreases in insider ownership percentages. Portfolios 2 and 3 include firms with the middle and greatest decreases in insider ownership percentages, respectively. Panel B reports the same statistics given in Panel A except the *t*-statistics in the last three rows now test the null that CARs for the portfolio with the greater decreases in insider ownership percentages is equal to or less positive compared to CARs for the portfolio with lesser decreases in insider ownership percentages. The symbols *, **, and *** indicate statistical significance at the ten percent, five percent, and one percent levels, respectively.

Panel A. Results when sample partitioned based on “absolute” level of insider ownership percentage			
<i>Portfolios</i>	<i>Mean (Range) for Insider Percentage after Offering</i>	<i>Mean (Range) for Two-Year “before” CARs</i>	<i>Statistic for $H_0: CARs = 0$</i>
Portfolio 1 (n = 207)	15.94% (0% – 26.10%)	161.4% (-79.0% – +2874.1%)	<i>t</i> = 7.54***
Portfolio 2 (n = 177)	34.84% (26.20% – 45.80%)	145.7% (-73.9% – +1658.8%)	<i>t</i> = 7.56***
Portfolio 3 (n = 130)	62.51% (45.90% – 100.00%)	121.7% (-54.3% – +832.6%)	<i>t</i> = 8.54***
<i>Portfolios Compared</i>	<i>Statistic for $H_0: Portfolio\ CAR_{Portfolio\ 3} = CAR_{Portfolio\ 2} = CAR_{Portfolio\ 1}$</i>		
Portfolios 1, 2, and 3	<i>F</i> = 0.93		
<i>Portfolios Compared</i>	<i>Statistic for $H_0: Portfolio\ CAR_{Portfolio\ 3} \leq CAR_{Portfolio\ 2} \leq CAR_{Portfolio\ 1}$</i>		
Portfolios 1 and 2	<i>t</i> = 0.54		
Portfolios 2 and 3	<i>t</i> = 1.00		
Portfolios 1 and 3	<i>t</i> = 1.55*		
Panel B. Results when sample partitioned based on “change” in insider ownership percentage			
<i>Portfolios</i>	<i>Mean (Range) Change in Insider Percentage from Offering</i>	<i>Mean (Range) for Two-Year “Before” CARs</i>	<i>Statistic for $H_0: CARs = 0$</i>
Portfolio 1 (n = 169)	-2.81% (-5.70% – +7.30%)	151.3% (-79.0% – +1250.6%)	<i>t</i> = 8.90***
Portfolio 2 (n = 167)	-8.90% (-12.40% – -5.80%)	135.4% (-69.6% – +1915.7%)	<i>t</i> = 7.10***
Portfolio 3 (n = 178)	-20.22% (-42.00% – -12.50%)	150.7% (-73.9% – +2874.1%)	<i>t</i> = 6.47***
<i>Portfolios Compared</i>	<i>Statistic for $H_0: Portfolio\ CAR_{Portfolio\ 3} = CAR_{Portfolio\ 2} = CAR_{Portfolio\ 1}$</i>		
Portfolios 1, 2, and 3	<i>F</i> = 0.20		
<i>Portfolios Compared</i>	<i>Statistic for $H_0: Portfolio\ CAR_{Portfolio\ 3} \leq CAR_{Portfolio\ 2} \leq CAR_{Portfolio\ 1}$</i>		
Portfolios 1 and 2	<i>t</i> = 0.62		
Portfolios 2 and 3	<i>t</i> = -0.51		
Portfolios 1 and 3	<i>t</i> = 0.02		

(that the SEO gives an opportunity for), the evidence in Panel A can also suggest that insiders are selling shares due to being disgruntled that their firms have not performed as well compared to other firms. For example, the last row of Panel A reports that the comparison of CARs for Portfolios 1 and 3 (the two portfolios with the greatest difference in insider percentages) generates a *t*-statistic that is significant at the ten percent level. This offers some marginal statistical support for the viewpoint that insiders may be dissatisfied. But more importantly, there is the economic difference of 39.7% between the mean CARs for Portfolios 1 and 3. This difference is arguably enough to cause insiders in Portfolio 3 to want to unload greater percentages of shares.¹²

Panel B in Table 3 focuses on analyzing if the change in insider ownership is related to long-run price performance “before” an SEO. Like Panel A, the two-year “before” CARs are all highly positive and significant at the one percent level. However, the panel also reveals that there is no monotonic relationship between the change in ownership percentages and the how the firm’s stock performs two years “before” SEO announcements. The next to the last row of Panel B shows that the sign for comparing Portfolios 2 and 3 is even opposite of the sign suggested by our research hypothesis given in *H-5* that states: “*Stock returns “before” an SEO announcement will be more positive for firms with greater decreases in insider percentages caused by the issuance.*” Thus, we find no evidence to conclude that firms undergoing greater decreases in insider percentages will experience greater stock price run-ups prior to their choice to undergo an SEO.

In conclusion, the two-year “before” results cannot reject either *H-2* or *H-5*. Thus, neither the “absolute” percentage of insider ownership or the “change” in this percentage tell us anything about prior stock price behavior consistent with the notion that insider ownership or behavior reflect that their shares are overvalued due to greater stock price run-ups. The only possible insight we can gather is the surprising finding that insiders sell shares based on the dissatisfaction in the firm’s relative stock price performance.

6.2. Long-run return results “after” the SEO announcements

Table 4 provides mean two-year cumulative abnormal returns (CARs) for years +1 and +2 “after” the event month. Once again, Panel A reports results when the sample is divided into three portfolios based on the “absolute” percentage of insider ownership, while Panel B gives results when the sample is divided into portfolios based on the “change” in the insider percentage.

¹² To understand why these insiders would undergo greater decreases in ownership percentages, consider an employee who is well paid when compared to all similar workers in society and therefore should be content. However, suppose this same employee is below the salary level of those with the same skills and occupation choice where this employee works. Further assume that this employee does not know if their subpar salary situation will change in the future. It stands to reason that this employee could be dissatisfied enough to seek employment elsewhere. Similarly, insiders can make sell decisions based on relatively poorer stock performances especially if they have no privileged information about what the future holds.

The first three rows in Panel A report that the respective two-day “after” CARs for Portfolios 1, 2 and 3 are 2.47%, 14.53% and -11.08%. This non-monotonic relationship between CARs and insider ownership percentages does not support *H-3*. On one hand, the CAR of -11.08% for Portfolio 3 is inferior to the other two CARs as predicted by *H-3* (and, as shown in the last column, its *t*-statistic is significant at the one percent level). However, on the other hand, the CAR of 14.53% for Portfolio 2 is superior to the 2.47% CAR for Portfolio 1 and thus of the opposite sign that *H-3* would predict given the small positive CAR of 2.47% for Portfolio 1. Furthermore, Portfolio 2’s CAR has a *t*-statistic that is significantly positive at the five percent level.

The results in the last four rows of Panel A mirror those in the first three rows by offering mixed results in rejecting the null given in *H-3*. The *F*-statistic is significant but its significance is not consistent with the research hypothesis for *H-3* due to the lack of monotonicity between insider ownership percentages and CARs. However, those firms with the very highest insider percentages perform in a way predicted by research hypothesis given in *H-3*. For example, comparing Portfolio 3 with either Portfolio 1 or 2 yields significant *t*-statistics that are also the sign predicted by *H-3*. Thus, at least for these two tests, we can reject the null. Overall, we conclude that Panel A offers no consistent support for the research hypothesis given in *H-3* that states: *Stock returns “after” an SEO announcement will be inferior for firms with greater percentages of insider ownership*. The lack of more evidence to support *H-3* is unexpected because one would think that firms with greater insider percentages would prevent an SEO if it was undervalued as reflected in risk-adjusted abnormal returns that positive. Thus, our mixed findings somewhat challenge the Myers and Majluf contention that an SEO signals overvaluation and thus future underperformance.

Panel B in Table 4 focuses on analyzing if the change in insider ownership is related to long-run price performance “after” an SEO. Our research hypothesis in *H-6* states: *Stock returns “after” an SEO announcement will be inferior for firms with greater decreases in insider percentages caused by the issuance*. The first three rows show that just the opposite occurs as the two-year “after” CARs are -18.17%, -0.84% and 22.57% for Portfolios 1, 2 and 3. Furthermore, the last column shows that the CARs for Portfolios 1 and 3 are statistically significant from zero and with signs for *t*-statistics that are inconsistent with the research hypothesis given in *H-6*. Thus, greater decreases in insider percentages lead to superior and even positive CARs. As shown in the last four rows of results in Panel B, the differences in CARs are all statistically significant when comparing sets of portfolios. The *F*-statistic of 10.24 along with high significant *t*-statistics are arguably the most striking results in all of this paper’s tables. Furthermore, Portfolio 1 and Portfolio 3 (the two portfolios with the greatest differences in changes in insider percentages) have a substantial economical difference of 40.74% in mean CARs besides the greatest *t*-statistic of 4.40.

Table 4
Long-run return results for “after” SEO announcements

This table reports two-year “after” cumulative abnormal return (CAR) results. Panel A reports results when the sample is divided into three portfolios formed according to the percentage of insider ownership that the prospectus gives as existing after the SEO is completed. Portfolio 1 contains firms with the least insider ownership percentages, while Portfolios 2 and 3 include firms with the middle and greatest percentages, respectively. The first three rows of results in Panel A report statistics for the insider ownership percentages and two-year “after” CARs. The last column for these three rows gives the *t*-statistics (with two-tailed significance levels) when testing if the portfolio two-year “after” CAR is equal to zero. The fourth row of results in Panel A reports analysis of variance (*F*-statistic) findings when testing the null that CARs are equal across portfolios. The last three rows give nonpaired one-tailed parametric *t*-statistic results when testing the null that CARs for the portfolio with the greater insider ownership percentages is equal to or less negative compared to CARs for the portfolio with the lesser percentages. Panel B reports results when the three portfolios are formed according to the change in the percentage of insider ownership. Portfolio 1 contains firms with the least decreases in insider ownership percentages. Portfolios 2 and 3 include firms with the middle and greatest decreases in insider ownership percentages, respectively. Panel B reports the same statistics given in Panel A except the *t*-statistics in the last three rows now test the null that CARs for the portfolio with the greater decreases in insider ownership percentages is equal to or less negative compared to CARs for the portfolio with lesser decreases in insider ownership percentages. The symbols *, **, and *** indicate statistical significance at the ten percent, five percent, and one percent levels, respectively.

Panel A. Results when sample partitioned based on “absolute” level of insider ownership percentage			
<i>Portfolios</i>	<i>Mean (Range) for Insider Percentage after Offering</i>	<i>Mean (Range) for Two-Year “After” CARs</i>	<i>Statistic for H₀: CARs = 0</i>
Portfolio 1 (n = 202)	16.25% (0% – 26.10%)	2.47% (-98.9% – +608.9%)	<i>t</i> = 0.40
Portfolio 2 (n = 198)	34.53% (26.20% – 45.80%)	14.53% (-98.3% – +971.4%)	<i>t</i> = 1.88*
Portfolio 3 (n = 214)	64.11% (45.90% – 100.00%)	-11.08% (-98.0% – +576.3%)	<i>t</i> = -2.26**
<i>Portfolios Compared</i>	<i>Statistic for H₀: Portfolio CAR_{Portfolio 3} = CAR_{Portfolio 2} = CAR_{Portfolio 1}</i>		
Portfolios 1, 2, and 3	<i>F</i> = 4.27**		
<i>Portfolios Compared</i>	<i>Statistic for H₀: Portfolio CAR_{Portfolio 3} ≥ CAR_{Portfolio 2} ≥ CAR_{Portfolio 1}</i>		
Portfolios 1 and 2	<i>t</i> = 1.22		
Portfolios 2 and 3	<i>t</i> = -2.82***		
Portfolios 1 and 3	<i>t</i> = -1.77**		
Panel B. Results when sample partitioned based on “change” in insider ownership percentage			
<i>Portfolios</i>	<i>Mean (Range) Change in Insider Percentage from Offering</i>	<i>Mean (Range) for Two-Year “After” CARs</i>	<i>Statistic for H₀: CARs = 0</i>
Portfolio 1 (n = 169)	-3.04% (-5.70% – +7.75%)	-18.17% (-98.0% – +335.7%)	<i>t</i> = -3.67***
Portfolio 2 (n = 167)	-9.10% (-12.40% – -5.80%)	-0.84% (-98.9% – +608.9%)	<i>t</i> = -0.14
Portfolio 3 (n = 178)	-19.59% (-41.50% – -12.40%)	22.57% (-97.5% – +971.4%)	<i>t</i> = 2.92***
<i>Portfolios Compared</i>	<i>Statistic for H₀: Portfolio CAR_{Portfolio 3} = CAR_{Portfolio 2} = CAR_{Portfolio 1}</i>		
Portfolios 1, 2, and 3	<i>F</i> = 10.24***		
<i>Portfolios Compared</i>	<i>Statistic for H₀: Portfolio CAR_{Portfolio 3} ≥ CAR_{Portfolio 2} ≥ CAR_{Portfolio 1}</i>		
Portfolios 1 and 2	<i>t</i> = 2.22**		
Portfolios 2 and 3	<i>t</i> = 2.41***		
Portfolios 1 and 3	<i>t</i> = 4.40***		

The findings in Tables 2, 3 and 4 offer some challenges to the basic tenets of signaling theories described earlier as being inherent in the predictions of Myers and Majluf (1984) and Leland and Pyle (1977) predictions. First, there is no consistent evidence for *T-1* that states: “*Insiders have wealth-enhancing information that can be revealed to outsiders through insider behavior.*” In particular, the insider behavior at the time of SEOs does not reveal the future prospects of the company. In fact, insiders act the opposite of what would enhance their long-run wealth. Second, the behavior by outsiders at the time of the SEO announcement is not totally consistent with *T-2* and *T-3* that respectively state: “*Outsiders believe insider behavior is self-serving and aimed at optimizing insider wealth*” and “*Outsiders understand and act on the information conveyed through insider behavior.*” On one hand, the short-term behavior of outsiders (as captured by the market response) is consistent with *T-4* that states: “*Outsiders’ response to an insider behavior will increase according to how many insiders (as measured by the absolute insider ownership percentage) can potentially profit.*” However, the market reaction at the time of the SEO announcements is such that insiders are allowed to have a short-term holding strategy that would allow profit through lowering their ownership percentages. Thus, outsider behavior does not support *T-5* that states: “*Outsiders’ reaction to an insider corporate decision will increase in proportion to how many insiders are overtly involved (as measured by the change in the absolute insider ownership percentage).*”

Perhaps, most importantly, the long-run response of the market offers no definitive support for *T-4* as just seen in Panel A of Table and no support at all for *T-5* as just seen in Panel B. The mixed results in Panel A call into question the notion that insiders have enough information and self-interest to issue equity when their stock is overvalued. Panel B’s results cast serious doubts on the idea that insiders have superior knowledge and can convey this through changes in their ownership percentages. Our results show no evidence that these underpinnings of signaling theory hold. On the contrary, investors would have been better served by doing the opposite suggested by insider behavior that accompany SEOs.

7. Results for Regression and Other Tests

We conduct a number of other tests. For brevity’s sake, we will only briefly summarize the results of some of these tests. First, we conducted regression tests to determine how variables that capture “absolute” insider percentages and “changes” in insider percentages hold up with variables commonly used in the research. The regression results for the two-day CAR mirrored the prior regression results of Hull and Mazachek (2001) in showing that the “absolute” insider percentage is the key explanatory variable. In examining the two-year “before” CAR, we found that variables capturing risk as well as the “absolute” insider ownership percentages best explained these CARs. For two-year “after” CAR, we found that both the “absolute” insider ownership percentage and the “change” in insider percentage variables were factors (even though the signs were not consistent with either Myers and Majluf or Leland and Pyle signaling theories). However, the most significant factors in explaining these “after” two-year CARs were variables that

captured risk and the two-year “before” CAR variable itself. Simply put, the better (poorer) a firm performs prior to an SEO, the poorer (better) it will perform after an SEO

We also repeated our two-day CAR tests using three-day and four-day CARs to study the short-run market response and found similar results. Adjusting for expected returns using various models did not change our short-run or long-run results. In addition, we repeated our tests by deleting observations that are typically omitted such as REITs, financials and utilities. Deleting these observations did not change our general findings, which may be explained by the fact these firms do not dominate any of the portfolios we compared. Similarly, adjusting for issuance costs following the methodology of prior research (Hull and Fortin, 1994; Hull and Kerchner, 1996) did not change our findings. Once again, it is because the issuance costs are similar for all portfolios. We also examined if our insider findings could be explained by the director and officer group or the other five percent ownership group. We could find no consistent evidence that either group consistently accounts for our results. However, by including both of these two groups, we were able to increase the significant levels. Studies that only consider directors and officers will not always have tests yielding true insider behavior. Finally, a number of tests indicated that firm size was not a significant factor in explaining our conclusions.

8. Summary

Prior research, not only in security offerings announcements but also other areas of corporate announcements, indicates that insider ownership is an important determinant of how the market reacts. These studies often focus on either the percentage of insider holdings or the trading by insiders around the time of the offering. This paper examines not only the “absolute” percentage but the actual “change” in insider percentages for seasoned offerings, which is arguably the insider information that tells us more precisely what insiders feel about the company. This information can be revealed at the time of the registration announcement when the prospectus states exactly what insider ownership percentages are expected to be both before and after the offering. Also, whereas prior studies concentrate on just officers and directors as a group, we are able to expand on this by also identifying other large owners who own and control five percent or more of the company. To our knowledge, our research is the first to examine how the actual change in insider percentages influences stock price behavior at the time of the announcement of a significant corporate event as well as for longer time periods before and after the announcement.

For our tests, we divided our sample into three portfolios based on either the “absolute” percentage of insider ownership or the “change” in the percentage of insider ownership. While verifying prior findings about the impact of the absolute percentage on the short-run market response, our other tests failed to corroborate many of this paper’s research hypotheses stemming from mainline signaling theories. In particular, we discovered three unexpected findings that not only call into question the predictions of

theories rooted in Majluf and Myers (1984) and Leland and Pyle (1977) but also challenge the very assumptions and foundations of signaling theory itself. First, firms in the portfolio with greatest insider ownership percentages perform relatively poorer before the announcement indicating that these firms are not selling because their stock is overvalued relative to that for other SEOs. Furthermore, we can find no consistent evidence that SEOs signal negative news about future performance based on the level of insider ownership at the time of the SEO. We conclude that firms with greater insider ownership levels undergo SEOs not so much to signal negative news about future prospects as to signal that past performances are relatively poorer.

Second, the short-run market response to an SEO announcement does not depend on the change in insider ownership percentages but only on the percentage that remains after the offering. This finding is anomalous in the sense that insiders appear to have no constraints as to how much they can lower their ownership percentages as long as there is a high threshold of ownership that remains. We conclude that insiders can use an SEO to maximize their wealth at the expense of other current stockholders and new stockholders because the market looks only at the percentage of ownership and not how the percentage changes. By simultaneously lowering their ownership proportions, yet selling at a premium value, it appears that insiders are able to maximize their own short-run welfare at the expense of current and newer shareholders.

Third, firms that undergo greater decreases in insider ownership surprisingly perform better after an SEO. Any short-run wealth obtained at the time of announcement pales in comparison to wealth lost in the following two years. This indicates that insiders are not signaling negative news with an SEO about overvaluation but have other agendas in mind such as diversification or they simply do not know what the firm's future prospects will be. We are left to conclude that SEOs do not really signal anything significant from insiders. Furthermore, the very foundation of signaling theory premised on insiders knowing more has been shaken. The implication is the outsider behavior should be more skeptical of insider ability to signal significant news through their behavior. In closing, future research should conduct tests with a more critical eye as to examining insider ability to convey significant information.

REFERENCES

- Asquith, Paul, and David W. Mullins, Jr., 1986, Equity issues and offering, *Journal of Financial Economics* 15, 61-89.
- Bhushan, Ravi, 1989, Firm Characteristics and Analyst Following, *Journal of Accounting and Economics* 11, 255-274.
- Born, Jeffery A., 1988, Insider ownership and signals: Evidence from dividend initiation announcement effects, *Financial Management* 17, 38-45.
- Brennan, Michael J., and Alan Kraus, 1987, Efficient financing under asymmetric information, *Journal of Finance* 42, 1225-1243.

- Brown, Stephen J., and Jerold B. Warner, 1985, Using daily stock returns: the case of event studies, *Journal of Financial Economics* 14, 1-31.
- Ching, Ken M.L., Michael Firth, and Oliver M. Rui, 2006, The information content of insider trading around seasoned equity offerings, *Pacific-Basin Finance Journal* 14, 91-117.
- Clarke, Jonathan, Craig Dunbar, Kathleen Kahle, 2001, Long-run performance and insider trading in completed and canceled seasoned equity offerings, *Journal of Financial and Quantitative Analysis* 36, 415-430.
- Copeland, Thomas E., and Won Heum Lee, 1991, Exchange offers and stock swaps—New evidence, *Financial Management* 20, 34-48.
- Cornett, M. and N. Travlos, 1989, Information effects associated with debt for equity and equity for debt exchange offers, *Journal of Finance* 44, 451-468.
- Dittmar, Amy, and Anjan Thakor, 2007, Why do firms issue equity? *Journal of Finance* 62, 1-54.
- Han, Ki C., and David Y. Suk, 1998, Insider ownership and signals: Evidence from stock split announcement effects, *Financial Review* 33, 1-18.
- Hirschey, Mark, and Janis K. Zaima, 1989, Insider trading, ownership structure, and the market assessment of corporate sell-offs, *Journal of Finance* 44, 971-890.
- Hull, Robert M., and Richard Fortin, 1994, Issuance expenses and common stock offerings for over-the-counter firms, *Journal of Small Business Finance* 3, 1-17.
- Hull, Robert M., and Robert Kerchner, 1996, Issue costs and common stock offerings, *Financial Management* 25, 54-66.
- Hull, Robert M., and JuliAnn Mazachek, 2001, Junior-for-senior announcements: A study of the role of insider ownership, *Review of Financial Economics* 10, 213-225.
- Hull, Robert M., and Richard Moellenberndt, 1994, Bank debt reduction announcements and negative signaling, *Financial Management* 23, 21-30.
- Jensen, Michael C., 1986, Agency costs of free cash flow, corporate finance, and takeovers, *American Economic Review* 76, 323-329.
- Jensen, Michael C., and William H. Meckling, 1976, Theory of the firm: Managerial behavior, agency costs and ownership structure, *Journal of Financial Economics* 3, 305-360.
- Kahle, Kathleen M., 2000, Insider trading and the long-run performance of new security issues, *Journal of Corporate Finance* 6, 25-53.
- Leland, Hayne E., and David H. Pyle, 1977, Informational asymmetries, financial structure, and financial intermediation, *Journal of Finance* 32, 371-387.
- Li, Xianghong, and Xinlei Zhao, 2006, Propensity score matching and abnormal performance after seasoned equity offerings, *Journal of Empirical Finance* 13, 351-370.
- Masulis, Ronald W., 1983, The Impact of capital structure change on firm value: Some estimates, *Journal of Finance* 38, 107-126.
- Miller, Merton H., and Kevin Rock, 1985, Dividend policy under asymmetric information, *Journal of Finance* 40, 1031-1051.
- Myers, S. C., and M. S. Majluf, 1984, Corporate financing and investment decisions when firms have information that investors do not have, *Journal of Financial Economics* 13, 187-221.
- Vermaelen, T, 1981, Common Stock Repurchases and Market Signaling: an Empirical Study, *Journal of Financial Economics* 9, 139-183.