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Price behavior and insider trading around seasoned equity offerings: the case of majority-owned firms

Shmuel Hauser [a], Elli Kraizberg [b,*], Ruth Dahan [c]

[a] *Ben Gurion University and Israel Securities Authority, Israel*
[b] *Bar Ilan University, School of Business, Ramat Gan 52900, Israel*
[c] *Maalot-Rating Agency, Israel*

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Abstract

Small public firms in the US and elsewhere are often managed by majority owners. This paper offers the hypothesis that majority insiders have an incentive to engage in insider trading around seasoned equity offerings (SEOs), primarily for the sake of preserving control. This hypothesis is tested side-by-side with traditional hypotheses regarding insider trading, such as signaling or growth opportunities that are often considered in the context of firms with dispersed ownership. The empirical analysis in this paper utilizes data of 76 SEOs announced by firms listed on the Tel Aviv Stock Exchange (TASE) between June 1989 and December 1997, whose inside ownership exceeds 50%. The results demonstrate the strong effect of expected post-announcement share price changes on insider trading, and a weaker effect of pre-announcement insider trading on price changes. Unlike minority insiders, who may have an incentive to trade on inside information in order to extract short-term capital gains, majority insiders appear to take the long-term view by buying shares before the offering in order to preserve or increase their control over the firm. This activity does not seem to be dependent upon the firm's growth opportunities. Rather, it seems to be market-dependent; that is, the ownership ratio of majority insiders is increased in a bear market and remains the same in a bull market.

JEL classification: G32
Keywords: Seasoned equity offerings; Insider trading; Majority-owned

* Corresponding author.
E-mail address: ekraizberg@yahoo.com (E. Kraizberg).

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1. Introduction

This paper demonstrates that the insiders' trading activity in majority-owned firms is primarily motivated by their desire to maintain control over the firms; that is, to avoid dilution of their share in the firm's equity. It is hypothesized that in the case of the firms with majority ownership, the effects of signaling and the firm's growth opportunities are supplanted or joined by the effects of the insiders' actions that wish to avoid dilution. These joint effects lead to a unique causal relationship between majority insider trading and share price behavior.

Ever since the early 1960s, when the SEC has been moving after insider trading, and, subsequently, since the well-publicized 1987 debate between J. Grundfest and Henry Manne, Dean of the Law and Economics Center at George Mason University, regarding the involvement of the legislature in insider trading, this issue has attracted increasing academic attention in both the fields of finance and law. Demonstrating the harmful effects of insider trading seems to be the popular view among many academicians and practitioners.

The academic view that supports the abolishment of the prohibition on insider trading focuses on the notion that the market can sort this issue out by adequately pricing inside information. Carlton and Fischel (1983) argue that common forms of managerial compensation are left to private negotiation and that no one would seriously argue that these forms of compensation should be set by government regulations, irrespective of how improper these compensations are (see also Dye (1984)). Coase (1960) argues that the issue of insider trading as a form of compensation depends on whether the information property rights are more valuable to the firm's managers or to the firm's shareholders. Carlton and Fischel, adhering to the market mechanism, have theorized that an efficient allocation of information property rights to the highest-valuing user does not require actual negotiations between insiders and shareholders, since as long as shareholders are aware of the existence of insider trading, both share prices and insiders' compensation will be higher.

Bainbridge (in press), besides providing a list of the 261 papers that have discussed insider trading, succinctly summarizes the arguments for and against allowing insider trading. Stamp and Welsh (1996) surveyed the insider trading laws in a small subset of developed countries, while Bhattacharya and Daouk (2000) carried out a comprehensive survey of the existence and enforcement (as measured by legal prosecutions) of insider trading laws around the world. In fact, they raise a second question, as to whether the existence and enforcement of insider trading laws actually matter. The existence and enforcement of insider trading laws in stock markets are a phenomenon of the 1990s. Indeed, the empirically observed negative effect of the enforcement of insider trading laws survives after controlling the foreign exchange rate factor, the liquidity factor, and a variable measuring shareholder rights.

An independent, partially related group of studies analyzes the effect of seasoned equity offering (SEO) announcements on share prices, but the evidence is inconclusive. Some of the studies suggest that SEO announcements convey a negative signal to investors, while others believe that these announcements should have a positive effect.[1]

[1] Examples of a positive signal are found in Myers and Majluf (1984), Loughran and Ritter (1995), and Spiess and Affleck-Graves (1995); examples of a negative signal are found in Pilotte (1992) and Denis (1994).

The two issues above, insider trading and the announcement effect of SEOs, have been simultaneously analyzed in the literature from various angles. Earlier evidence of insider trading aimed at depressing share prices appear in Barclay and Litzenberger (1988), Lease et al. (1991), and Safieddine and Wilhelm (1996).[2] Gerard and Nanda (1993), for example, propose a model predicting increased selling by informed traders looking for profit by manipulating the offering prices before the SEO.

Further, Karpoff and Lee (1991) examined insider trading before the announcement of primary offerings of common stock and debt. Their data set contains firms in which insiders have minority holdings. Thus, they view trading on privileged information as a benefit, countered only by the possible penalties of the law. However, they disregard the long-term considerations, in the event that these insiders own the majority of the firms' shares. Lee (1997a,b) examines top executives' trading and the long-run stock returns of seasonal equity-issuing firms and finds no close relationship between the two, explaining this by using three main arguments: cognitive bias in executives' own projections, underestimation of cash flow problems subsequent to SEOs, and the very short-term horizon of management. Kahle (2000) examines insider trading around SEOs and finds that insiders tend to sell and avoid purchases prior to SEOs, and that industrial firms, which are characterized by increasing sales on the part of insiders, tend to underperform in the long-run.

Evidence of systematic mispricing of SEOs has been documented in the literature, confirming various hypotheses regarding the relationship between SEOs and insider information. Myers and Majluf (1984) hypothesize that the management has an incentive to raise new equity when the firm's share value that is perceived by the management is below the market price. Similarly, Lee (1997a,b) and others show that firms facing favorable investment opportunities tend to finance them by an SEO if managers believe that shares are overpriced. If this is the case, the announcement of an SEO sends the market a signal that those shares are overpriced. This hypothesis is empirically confirmed by Smith (1986) and others, who show that share prices systematically decline in response to an SEO announcement.[3] Furthermore, Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995) show that the negative market reaction persists in the long run. A wide recognition of this phenomenon is reported by Brous (1992) and Jain (1992), who show that analysts commonly downgrade their projections of a firm's performance if followed by an SEO announcement.[4] The opportunity to initiate an SEO which would send a negative market signal gives insiders the power to benefit from trading on private information: They can sell the shares that they hold or sell them short before initiating the

[2] Safieddine and Wilhelm (1996) argue that the expected rate of return on newly issued equity is largely dependent on insider trading around the announcement date. They find that before the establishment of the new rule, insiders commonly sold short in the expectation of a price decline (see also Lee (1997a,b)). The theory underlying this restriction is that share prices tend to react negatively to the announcement of an SEO. Of related interest, in 1988, the US National Association of Securities Dealers and SEC have barred insiders from covering a short position created after the announcement of an SEO (rule 10b-21). There is no such rule in Israel.41.

[3] See also Mikkelson and Partch (1986), Asquith and Mullins (1986), Masulis and Korwar (1986), Barclay and Litzenberger (1988), and Hansen and Crutchley (1990).

[4] See also Hansen and Crutchley (1990), and Patal et al. (1993).

SEO announcement. As pointed out by John and Narayanan (1993), insiders can prevent their own trading from betraying their intentions by purchasing shares prior to the announcement and trading against information.

An alternative hypothesis has been given by Pilotte (1992), Cooney and Kalay (1993), and Denis (1994), who report evidence of share prices that react positively to an SEO announcement, a phenomenon attributed by John and Williams (1985) and Cooney and Kalay (1993) to unique growth opportunities.[5] As in the case of a negative signal, the direction of causality under rapid growth is from the expected positive price changes to insider trading that is aimed at increased shareholding, not in the opposite direction.

All of the above findings relate to insiders *who are not majority owners* and, therefore, might not be forced to consider the long-term impact of their trading on equity holdings. This may not be the case for countries, other than those examined in the above research, in which insiders are majority holders. As of 1998, insider trading laws exist in 87 of 103 stock markets world wide, but enforcement—as evidenced by prosecutions—has taken place in only 38 of them (see Bhattacharya and Daouk). Yet, the previous empirical work on this subject is devoted to large firms in highly developed capital markets, characterized by diffused ownership and *minority* insiders holding a small fraction of the firm's equity. *Majority* insiders, who are common among small- and medium-sized firms in all but the most developed capital markets, may have different motivation than those that were cited above. This is exactly the focus of this paper.

This study investigates trading around SEOs by *majority* insiders on the Tel Aviv Stock Exchange (TASE). The empirical tests are based on unique data that allow us to examine the issue in firms that are *closely* held by insiders. Our sample data include all of the firms that had SEOs in the past 10 years, small- and medium-sized majority-owned firms, which are traded on the TASE.

Insider trading laws are strictly enforced in Israel and are governed by The Security Act of 2000-Fifth Edition (minorly revising the 1986 ACT). This legislation closely follows the corresponding American one (Section 16 of the 1934 ACT and Rule 10b-5) with minor differences. For example, an insider is anyone who has been given access to inside information for 6 months or less prior to the date at which the insider "uses" the information. However, non-use of owned insider information may still be an offense if the information has been obtained with an intent to use, or conveyed to someone who had an intent to use. Furthermore, an insider must report a transaction within few hours of a trade so that it will be published in the very next issue of the daily newspapers in their capital market section. The report is made to the TASE and the Israeli SEC, and the TASE distributes the information to all members of the TASE. If the TASE fails to distribute the information within 4 days of the report, the information is no longer considered as inside information.

We offer an additional hypothesis which differs from the current literature that focuses on firms with diffused ownership and hypothesize that the systematic mispricing of SEOs and its relationship to insider trading is related to: (i) the signaling content of SEOs, and

[5] Loderer et al. (1991) report that positive returns begin immediately after the issuence in Nasdaq, but only 30 days after the offering date in the NYSE and ASE.

(ii) the growth opportunities that the firm faces. This issue has not been dealt with in the literature with respect to many small firms in the US and in many other countries[6] that are characterized by a small group of insiders, holding a major portion of the equity. We hypothesize that these insiders are primarily motivated by their wish to maintain and solidify their control over the firm. Furthermore, trading activity of majority shareholders may be explained by their desire to maintain control over the firms. That is, first and foremost, they wish to avoid dilution and at the same time exploit market opportunities by purchasing undervalued shares. This hypothesis is tested side-by-side with the hypotheses that their trading activity is also triggered by changes in the firms' growth opportunities and prior knowledge of favorable or unfavorable signals conveyed to investors.

The paper begins with a standard event study methodology to examine insiders' trading activity and estimate the pricing of SEOs around the announcement of these SEOs. We then examine the causal relationship between these two variables.

The results support our hypotheses. First, we demonstrate that in majority-owned firms, insiders' trading activity may not be explained by changes in the firm's growth opportunities and is weakly related to the signaling hypothesis. However, our findings reveal a consistent dependence of majority insider trading on market conditions. In a bull market, insiders buy shares proportional to the size of the SEO, that is, they preserve their majority ownership as it was just prior to the SEO, while in a bear market, they typically buy more than the proportional size of the SEO, thereby increasing their ownership ratio. This finding is not in conflict with the notion of market efficiency since there is no evidence that these actions have any predictive value nor they affect the share prices. For example, timing of purchases during bull or bear market is not consistent.

While the findings reported in the literature imply that the direction of causality between share price changes and insider trading around SEOs can go either way, depending on the firm's growth opportunities and signaling effects, our results, instead, suggest a different pattern of causality between these two variables. Majority insiders, who generally have a long-term horizon, do not seem to be tempted to take advantage of opportunistic short-term capital gains. Regardless of market conditions, and as a reaction to an SEO, they are induced to buy additional shares in an amount that is sufficient to preserve their control over the firm. In a bear market, however, when share prices are trending down, they tend to buy additional shares, either to support declining share prices or to increase their stake in the firm's equity. This is clearly in contrast with empirical evidence reported in the literature regarding firms with diffused ownership; in these types of firms, minority insiders seem to have a short-term investment horizon. They tend to sell shares when they are expecting a price decrease in reaction to an SEO announcement, or to buy shares in expectation of a price increase (e.g., Safieddine and Wilhelm (1996); Lee (1997a,b).

The organization of the paper is as follows. Section 2 presents the hypotheses of the paper, Section 3 describes the data and methodology, and Section 4 reports the results. Section 5 presents a summary and a conclusion.

[6] For example; Italy, Finland, Sweden, Belgium, Hong-Kong, and Taiwan.

2. Hypothesis

2.1. Background

The literature offers several explanations for the systematic mispricing of SEOs and its relationship to insider trading, such as the signaling effect and reaction to the firm's growth opportunities. Both have been discussed and tested regarding firms with diffused ownership.

2.1.1. Signaling

Myers and Majluf (1984) have hypothesized that management has an incentive to raise new equity when the firm's share value, as perceived by management, is below market price. Similarly, Lee (1997a,b) and others have demonstrated those firms that face favorable investment opportunities tend to finance them by offering equity if managers believe that shares are overpriced. If this is the case, the announcement of an SEO signals the market that those shares are overpriced. This hypothesis is empirically confirmed by Smith (1986) and others, who demonstrate that share prices decline systematically, responding to an SEO announcement.[7] Furthermore, Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995) show that the negative market reaction persists in the long run. This phenomenon has also been discussed by Brous (1992) and Jain (1992), who show that analysts commonly downgrade their projections of a firm's performance, if followed by an SEO announcement.[8] The opportunity to initiate an SEO, which could send a negative market signal, gives insiders the advantage of trading on private information: they can sell shares that they hold, or sell them short prior to the SEO announcement. As pointed out by John and Narayanan (1993), insiders can prevent their own trading from betraying their intentions by purchasing shares prior to the announcement and trading against information.

2.1.2. Unique growth opportunities

Pilotte (1992), Cooney and Kalay (1993), and Denis (1994) have reported evidence of share prices that react positively to an SEO announcement, a phenomenon attributed by John and Williams (1985) and Cooney and Kalay (1993) to unique growth opportunities.[9] As in the case of a negative signal, the direction of causality under rapid growth moves from expected positive price changes to insider trading.

2.2. This paper's hypothesis

The fundamental hypothesis of this paper is that insiders' trading activity in majority-owned firms is primarily motivated by their desire to maintain control over the firms, that

[7] See also Mikkelson and Partch (1986), Asquith and Mullins (1986), Masulis and Korwar (1986), Barclay and Litzenberger (1988), and Hansen and Crutchley (1990).

[8] See also Hansen and Crutchley (1990) and Patal et al. (1993).

[9] Loderer et al. (1991) report that positive returns begin immediately after the issuance in NASDAQ, but only 30 days after the offering date in the NYSE and ASE.

is, to avoid dilution of their share in the firm's equity. It is hypothesized that in the case of firms with majority ownership, the effects of signaling and the firm's growth opportunities are supplanted or joined by the effects of insiders' actions that wish to avoid dilution. These joint effects lead to a unique causal relationship between majority insider trading and share price behavior.

Based on the observation that the ownership ratio of the majority of the insiders is usually preserved in the face of repeated SEOs, we hypothesize that in majority-owned firms, insiders have a long-term incentive to maintain control over the firm by avoiding dilution that may occur through repeated SEOs. We further hypothesize that any expected change in prices will not have any effect on insiders' trading activity and that, therefore, a causality relationship will not be observed. Finally, following the empirical evidence in the literature, we also examine the relationship between market dynamics and insiders' trading activity. We hypothesize that while in a bull market, majority insiders are more likely to buy shares in an amount sufficient to protect their ownership ratio, in a bear market, they are more likely to buy shares in *excess* of the amount required to maintain their ownership ratio. In this case, causality should run only in one direction: from share price movements to insider trading.

3. Data and methodology

3.1. Methodology

The methodology relies on the CAR and VEC models where the latter is an improvement of Sims' (1980) Vector Auto Regression (VAR), and meant to handle time series analysis, testing for different types of causality phenomena. The VEC model is widely used in Finance (see, for example, Lee, 1992; Maysami and Koh, 2000).

The first hypothesis of this paper states that insiders' trading activity in majority-owned firms is primarily motivated by their desire to maintain control over the firms. We therefore examine the insiders' trading activity around the announcement date of the SEOs. We average the percentage *change* in the ratio of insider holdings (INSIDE) on day t across firms. Then, we derive the cumulative average change in insider holdings (CINSIDE), namely, the cumulative insider trading by day T ($T=-180, -179,\ldots, 0\ldots, 180$) where, $T=0$ is the announcement date.

$$\mathrm{CINSIDE}_T = \sum_{t=-180}^{T} \mathrm{CINSIDE}_t. \tag{1}$$

The results are categorized by the insiders' trading activity in a bull market as opposed to that in a bear market. If INSIDE_T is insignificantly different from zero, it indicates that majority insiders trading activity is aimed to buy shares only in an amount that is sufficient to preserve their control. If, however, INSIDE_T is significantly different from zero, it may indicate that their trading activity is dependent upon their perception of the firm's growth opportunities, market conditions, such as bull or bear markets, or the effects of signals conveyed to non-insider investors. This point will be further analyzed below.

The next step involves estimation of excess returns around the announcement of the SEO utilizing the market model:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}, \tag{2}$$

where R_{it} is the observed rate of return on stock i on day t, and R_{mt} and ε_{it} are the contemporaneous rates of return on the market portfolio and excess return on stock i, respectively. Parameters α and β are estimated from a sample of daily observations over a period of 30 months, starting 6 months after the offering date. We then calculate the abnormal return (AR) and cumulative abnormal return (CAR) as follows:

$$\mathrm{AR}_t = \frac{1}{N}\sum_{i=1}^{N} \varepsilon_{it}, \tag{3}$$

and

$$\mathrm{CAR}_T = \sum_{t=-180}^{T} \mathrm{AR}_t, \tag{4}$$

where AR_t is the rate of return on day t, averaged across the sample of N firms, and CAR_T is the cumulative average rate of return until day T. Positive or negative INSIDE_T vis-à-vis positive or negative CAR_T at the pre- or post-announcement date may be an indication that insiders are induced to trade around the announcement date of SEOs. For example, if majority insiders who are well-informed investors sell shares prior to the announcement date and buy shares after that date, and if CAR_T is negative (for $T>0$), it would support Myers and Majluf's (1984) hypothesis that new equity is raised when the firm's share value is perceived to be lower than the market value. If, however, positive (negative) INSIDE_T is associated with positive (negative) CAR_T, respectively, it may indicate the effect of signaling and/or insiders' trading activity that is aimed to exploit market opportunities.

Additionally, we address the issue of insiders' incentives to engage in trading around the announcement date by testing for causal relationships between insiders trading activity and rates of return on shares that were bought at SEOs. If we find that INSIDE_T causes CAR_T, it will support the signaling hypothesis. On the other hand, if we find that CAR_T causes INSIDE_T, it will indicate that insiders tend to exploit market opportunities. We perform a battery of tests based on the Vector Error Correction (VEC) Model and Sims's Model. The VEC model is used to estimate the causal relationship between the two time series, CINSIDE and CAR, as follows:

$$\Delta\mathrm{CAR}_t \equiv \mathrm{AR}_t = a_0 + \sum_{j=1}^{5} b_j \mathrm{AR}_{t-j} + \sum_{j=1}^{5} c_j \mathrm{INSIDE}_{t-j} + d_j \mathrm{coint}_t \tag{5a}$$

$$\Delta\mathrm{CINSIDE}_t \equiv \mathrm{INSIDE}_t = \alpha_0 + \sum_{j=1}^{5} \beta_j \mathrm{INSIDE}_{t-j} + \sum_{j=1}^{5} \gamma_j \mathrm{AR}_{t-j} + \delta_j \mathrm{coint}_t, \tag{5b}$$

where coint is a co-integration factor required in the event that a linear combination of the two time series is non-stationary (see Engle and Granger (1987)). Finally, we determine the degree of stationarity of each time series using the Dickey and Fuller (1981) unit-root tests and the Johansen (1988) co-integration test.

These tests are designed to identify univariate and bivariate causality between insider trading and excess return. Univariate causality requires that some j, c_j or γ_j be significantly different from zero. Bivariate causality requires that both c_j and γ_j be significantly different from zero. The time lag of five trading days is set based on our estimations, showing that the outcomes shown in Eqs. (5a) and (5b) are not significantly affected by longer lags.

3.2. Data

Our sample consists of 78 SEOs between 1989 and 1997 by firms listed on the Tel Aviv Stock Exchange (TASE), of which 49 occurred during a bull market period from June 1989 to December 1993, and 29 during a bear market period from January 1994 to December 1997. Twenty-nine SEOs were excluded from the sample due to: (i) incomplete data, and/or (ii) offerings of security bundles, which were not limited to common equity, and included warrants or debentures. A combination of securities could influence the outcome of the offering and the pricing of equity.[10] Thus, other than the above exceptions, the sample is an exhaustive list of all SEOs during the sample period. Prior to that period, SEOs were rare, and adequate data were not available. Our data set includes only small and medium-sized majority-owned firms. Over 90% of the firms in the Israeli market are closely held by a small number of insider-shareholders.[11] According to the Securities Law in Israel, an insider is defined as either a manager, a director, or an investor who holds at least 5% in equity or voting rights. In most firms whose shares are listed on the TASE, a small number of shareholders, who are generally members of the same family, controls the firm by holding 50% or more.

Information on insider trading was extracted from reports on insider transactions filed with the Israel Securities Authority (Israeli SEC). The data covers all insider holdings over a 180-day period, before and after an SEO announcement. We computed the daily ratio of insider ownership for each firm by dividing the number of shares held by insiders by the number of all outstanding shares. Thus, if insiders increased their holdings by the same percentage as the proportion of the SEO in relationship to the overall number of outstanding shares, there was no change in the aggregate insider ownership. Data on other firm-related variables included net profits, market, and book values of equity immediately, before, and after the offering, financial leverage measured by book values reported on the first quarterly report after issuance, and underwriter fees measured as a ratio of underwriter overall compensations to the size of the issue.

[10] See Schultz (1993), Jain (1992), and Hauser and Levy (1996).

[11] In most of the remaining firms, majority shareholders hold 40% to 50%. Only few of them are less then 40%.

Table 1
Descriptive statistics

	All offerings		1989–1993		1994–1997		*F* *p*-value	KW *p*-value
	Mean	Median	Mean	Median	Mean	Median		
Number of SEOs	76		47		29			
SEO Characteristics								
Issue size (million NIS)	27.84	17.97	38.15	20.05	21.48	17.25	0.051	0.593
Insider holdings (%)	69.58	74.93	74.03	80.19	62.68	68.72	0.013	0.006
Firm Characteristics								
Equity market value	148.03	62.89	176.41	66.20	97.00	55.60	0.280	0.361
Tobin's *Q*	2.48	2.28	2.68	2.34	2.13	1.83	0.182	0.104
Return on equity	0.77	3.06	3.74	6.38	-4.59	1.17	0.035	0.013
Financial leverage	0.57	0.63	0.63	0.65	0.47	0.53	0.018	0.035

Range of insider holdings

Entire period	from 9.15% to 93.06%
1989–1993	from 20.55% to 93.06%
1994–1997	from 9.15% to 87.04%

Average number of days that insiders have traded

	Before −180 days		After +180 days	
	Average date	Number of days	Average date	Number of days
1989–1993	−28	12	30	20
1994–1997	−32	18	28	23

Characteristics of the data set. Offering equity values are given as of the issuance date (in millions of NIS). Underwriter fees are expressed as percentage of the offering. Tobin's *Q* is the equity value plus long-term liabilities divided by total book assets. Return on equity is the ratio of net profits to book equity. The financial leverage is the ratio of long-term liabilities to total assets. *F* is the *p*-value for statistical inference about the means using one-way analysis of variance. KW is the Kruskal–Wallis test for the medians.

Table 1 provides descriptive statistics of the sample divided into two periods: bull and bear markets. The aggregate market value of SEOs during the first period was significantly greater than that in the second period, but the change in the average underwriter fee ratio and Tobin's Q were insignificant. The average firm's rate of return on equity was significantly lower during the second period.

4. Results

4.1. Excess return and insider trading around SEOs

Table 2 reports excess rates of return and insider trading around the announcement date. It reveals a striking contrast between bull and bear markets. Excess returns were significantly positive (+36%) during the bull market of 1989–1993, and significantly negative (−18%) during the bear market of 1994–1997. Our results suggest that stock returns around SEOs are heavily influenced by the performance of the stock market as a whole. The apparent contribution of market-wide growth opportunities to SEO excess returns is consistent with the figures reported in Table 1, showing that the book return on equity was significantly higher during the first period. These results are also consistent with evidence reported by Cooney and Kalay (1993).

Table 2 further reports no significant change in the insider ownership ratio during 1989–1993. The only exception is INSIDE(5,10), that may be explained by the insiders' attempt to support falling share prices during the first few days following the offering date. Overall, since holdings are measured in relative terms, we interpret this as an indication that insider trading during the bull market was limited to a defensive strategy of preserving control over the firm.

Unlike the bull market of 1989–1993, during the bear market of 1994–1997 insiders were net buyers of the firm's stock, mainly after the announcement date. On average, their holdings increased by more than 5% of the overall equity. These shares were purchased at a depressed price after the announcement, being an opportunity to accumulate shares inexpensively and solidify control over the firm in the long run. One may argue, however, that by buying shares after the announcement, when share prices are trending down, majority insiders seem to be willing to sacrifice personal wealth in order to secure their majority position. On the other hand, they may wish to provide price support, since the decline in prices would have been more severe, if they did not purchase these shares. In both cases, this behavior seem to be inconsistent with the proposition made by Myers and Majluf's (1984), Lee (1997a,b) and others that the timing of SEOs is related to management perception of whether their firm's shares are overpriced or underpriced, and not to the firm's growth opportunities. This conclusion is reinforced by the following regression analysis:

$$\underset{}{\text{CINSIDE}(-180,180)} = \underset{}{0.725} - \underset{(0.766)}{0.046}\underset{}{\text{Tobin\_}Q} \underset{(0.955)}{} \qquad R^2 = 0.0\%.$$

These results indicate that insiders' trading activity is not related to growth opportunities. When CINSIDE(−180,180) is replaced with CINSIDE(−180,0) or CINSIDE(0,180),

Table 2
Excess Returns and Insider Holdings

(T_1,T_2)	Excess return (%)		Change in insider holdings (%)	
(−)(+)Days before/ after announcement	AR(T_1,T_2)	CAR(−180,T_2)	INSIDE(T_1,T_2)	CINSIDE(T_1,T_2)
	Mean (*t*-value)	Mean (*t*-value)	Mean (*t*-value)	Mean (*t*-value)
Panel A: bull market period (1989–1993)				
−180; −150	4.06 (0.954)	4.06 (2.112)*	0.28 (1.334)	0.28 (1.333)
−150; −120	3.66 (1.141)	7.72 (2.532)*	0.06 (0.339)	0.33 (1.175)
−120; −90	2.78 (0.831)	10.50 (2.577)*	0.29 (0.777)	0.62 (1.203)
−90; −60	7.25 (1.876)	17.75 (3.384)*	−0.06 (−0.331)	0.57 (1.155)
−60; −30	5.54 (1.591)	23.29 (3.636)*	0.10 (0.316)	0.66 (1.245)
−30; −15	8.37 (3.620)*	31.66 (4.729)*	−0.35 (−1.402)	0.32 (0.564)
−15; −10	2.24 (1.496)	33.90 (4.821)*	−0.06 (−1.557)	0.26 (0.455)
−10; −5	−0.01 (−0.008)	33.89 (4.772)*	−0.05 (−1.411)	0.21 (0.358)
−5; 0	0.57 (0.440)	34.47 (4.714)*	0.10 (0.585)	0.30 (0.511)
0; 5	−3.13 (−1.952)	31.34 (4.234)*	−0.12 (−0.400)	0.19 (0.291)
5; 10	−1.79 (−1.037)	29.54 (3.841)*	0.69 (1.947)	0.88 (1.261)
10; 15	−1.44 (−1.149)	28.11 (3.536)*	−0.69 (−1.036)	0.19 (0.185)
15; 30	1.89 (0.784)	30.00 (3.455)*	−0.66 (−1.642)	−0.47 (−0.439)
30; 60	1.47 (0.423)	31.48 (3.168)*	−0.23 (−0.939)	−0.70 (−0.643)
60; 90	3.75 (1.128)	35.22 (3.195)*	−0.96 (−1.405)	−1.66 (−1.266)
90; 120	3.72 (1.251)	38.94 (3.220)*	0.00 (0.006)	−1.66 (−1.267)
120; 150	−4.07 (−1.245)	34.87 (2.616)*	0.04 (1.371)	−1.62 (−1.234)
150; 180	1.21 (0.345)	36.08 (2.496)*	−0.4 (−1.183)	−1.66 (1.262)
Panel B: bear market period (1994–1997)				
−180; −150	6.09 (1.673)	6.09 (5.832)	0.47 (1.777)	0.47 (1.840)
−150; −120	−0.08 (−0.018)	6.01 (3.206)	−0.60 (−1.498)	−0.14 (−0.258)
−120; −90	−3.46 (−1.138)	2.55 (1.121)	0.58 (2.313)*	0.45 (0.772)
−90; −60	3.66 (1.059)	6.23 (2.303)	−0.99 (−1.215)	−0.54 (−0.481)
−60; −30	−1.06 (−0.214)	5.17 (1.508)	0.81 (1.224)	0.27 (0.184)
−30; −15	2.65 (1.191)	7.81 (2.021)*	0.23 (1.207)	0.50 (0.310)
−15; −10	1.21 (0.731)	9.03 (2.269)*	0.03 (0.571)	0.53 (0.333)
−10; −5	−2.94 (−1.733)	6.09 (1.513)	0.16 (0.778)	0.69 (0.429)
−5; 0	1.46 (0.806)	7.55 (1.794)	−0.06 (−0.981)	0.64 (0.392)
0; 5	−8.64 (−3.714)*	−1.09 (−0.251)	0.23 (2.341)*	0.86 (0.514)
5; 10	−6.08 (−3.696)*	−7.17 (−1.612)	0.35 (0.648)	1.22 (0.712)
10; 15	−5.54 (−3.307)*	−12.71 (−2.79)*	2.88 (2.196)*	4.10 (1.921)
15; 30	−2.74 (−0.963)	−15.45 (−3.15)*	0.07 (0.093)	4.17 (1.789)
30; 60	0.09 (0.025)	−15.36 (−2.74)*	0.86 (2.161)*	5.02 (2.011)*
60; 90	−1.91 (−0.365)	−17.27 (−2.70)*	−0.06 (−0.130)	4.96 (2.067)*
90; 120	−1.88 (−0.446)	−19.15 (−2.69)*	0.54 (2.118)*	5.51 (2.256)*
120; 150	−1.83 (−0.457)	−20.98 (−2.67)*	0.03 (1.038)	5.54 (2.273)*
150; 180	3.23 (0.849)	−17.74 (−2.13)*	0.00 (1.038)	5.54 (2.274)*

Excess returns (CAR) and change in relative insider holdings (CINSIDE) around issuance dates. Parameters T_1 and T_2 define the measurement period of CAR and CINSIDE in reference to the announcement date at point zero in time.

* Significant at the 1% level.

and when Tobin's Q is replaced with the ratio of net income to equity, leverage ratio, or size, the results are essentially the same. Altogether, these results unambiguously support our hypothesis that the primary goal of majority insiders is to preserve and strengthen their ownership position.

In the next subsection, we take a closer look at two related issues that are raised above: the direction of causality between insider trading and share price changes, and the information content of insider trading.

4.2. Causality between excess returns and insider trading

We examine causality between insider trading and excess returns around the SEO announcement by analyzing the time series of CAR and CINSIDE over a time window of 360 to 180 days before and after the announcement. A test of causality between the two series, utilizing the VEC model, requires that each of the two series and their linear combination be stationary. The unit-root tests reported in Table 3 indicate that while the two series themselves are not stationary, their first differences ΔCAR and ΔINSIDE are. A co-integration test further indicates that the linear combination of the first differences is still non-stationary, which calls for the inclusion of the co-integration factor in the VEC model, as in Eqs. (5a) and (5b).

As previously noted, the purpose of these tests is to investigate the causal relationship between CINSIDE and CAR. If CINSIDE causes CAR, we consider it to support the signaling hypothesis. If CAR causes CINSIDE, it is considered to be an indication that insiders' trading activity is also aimed at exploiting market opportunities. Results of the VEC model, displayed in Table 4, demonstrate that c_j and γ_j are significantly different from zero for some j, $j \in 1,5$, indicating bi-variate causality between insider trading and share price changes. The causality appears to be more significant during the bear market of 1994–1997 than during the bull market of 1989–1993.

During the first period, none of the γ_j-coefficients are significant, suggesting that CINSIDE does not cause CAR, and, thus, does not support the signaling hypothesis.

Table 3
Unit-root and co-integration tests

	Entire Sample	1989–1993	1994–1997
Panel A: unit-root tests			
CAR	−2.15	−1.21	−2.15
CINSIDE	−2.56	−2.13	−2.04
AR	−5.49*	−6.21*	−6.04*
INSIDE	−6.41*	−6.92*	−5.94*
Panel B: co-integration tests			
	15.17	7.28	13.69

Dicky–Fuller unit-root and Johansen co-integration tests are used to identify stationarity of the time series AR and INSIDE and their linear combinations, respectively. The sample period is 180 days before and after the announcement. The numbers represent t-statistics for the Dicky–Fuller test and the log-likelihood statistic for the co-integration test.

* Significant (stationary) at the 1% level.

Table 4
Causality effects

	Entire sample		1989–1993		1994–1997	
	AR	INSIDE	AR	INSIDE	AR	INSIDE
AR_{t-1}	−0.3949*	4.0176*	−0.5868*	−1.8024**	−0.2482*	6.3623*
AR_{t-2}	−0.2841*	3.4182*	−0.4761*	0.6118	−0.1632**	5.8575*
AR_{t-3}	−0.1976*	0.7556	−0.3292*	−0.1855	−0.2206*	2.5499**
AR_{t-4}	−0.1328**	0.8089	−0.2238*	−0.3329	−0.2001*	2.2062**
AR_{t-5}	−0.0688	−0.0752	−0.0803	0.2978	−0.1449*	0.0886
$INSIDE_{t-1}$	0.0217*	0.0277	0.0122	−0.0404	0.0127*	−0.0149
$INSIDE_{t-2}$	0.0262*	−0.0159	0.0126	−0.1570	0.0153*	−0.2808*
$INSIDE_{t-3}$	0.0154*	−0.2570*	0.0079	−0.2333*	0.0079	−0.0941
$INSIDE_{t-4}$	0.0089**	−0.1061	0.0045	−0.0393	0.0054	−0.1233**
$INSIDE_{t-5}$	0.0039	0.0358	0.0028	−0.1240	0.0050	0.0015
$Coint_t$	−0.2024*	−7.273*	−0.2250*	−4.3150*	−0.3150*	−11.5459*
R^2	0.2951	0.5112	0.3106	0.5165	0.2965	0.4803

Results of the VEC test based on equations

$$\Delta CAR_t \equiv AR_t = a_0 + \sum_{j=1}^{5} b_j AR_{t-j} + \sum_{j=1}^{5} c_j INSIDE_{t-j} + d_j coint_t$$

$$\Delta CINSIDE_t \equiv INSIDE_t = \alpha_0 + \sum_{j=1}^{5} \beta_j INSIDE_{t-j} + \sum_{j=1}^{5} \gamma_j AR_{t-j} + \delta_j coint_t,$$

where coint is the co-integration factor required when a linear combination of CAR and CINSIDE is non-stationary. The sample period covers 180 days before and after the announcement.

* Significantly different from zero at the 1% level.

** Significantly different from zero at 5% level.

One possible explanation is that during a bull market, apart from the fact that share prices are relatively expensive for insiders, they do not really need to buy shares to support their prices since share prices are trended up. During the second period, however, some c_j $(j=1,2)$ are statistically significant at a 5% level. c_j that are significantly different from zero support the signaling effect, indicating that insiders' trading activity leads to significant changes in share prices. It is likely that during a period of a poor market performance, insiders' own valuation systematically exceeds market prices. As well-informed traders, this view would encourage them to buy shares above and beyond the quantity which is sufficient to preserve their ownership ratio. Thus, they take this action in order to increase their control over the firm or to send a favorable price signal just before the offering date. With either of these two objectives in mind, this transaction is not necessarily intended for obtaining short-term capital gains. This behavior is also consistent with the fact that, on the average, insiders' trading activity increased their holdings from 67% during the first period to 69% during the second period, straight across the board, that is, even in firms that have not offered their securities to the public.

In both periods, the results demonstrate that CAR causes CINSIDE (some are significantly different from zero), suggesting that majority insiders are also tuned into exploiting market opportunities. The significant coefficient of AR_{t-1} indicates that insiders buy shares when share prices increase during the bear market period. The

significant coefficients of AR_{t-1} imply that insiders tend to become net buyers and increase their holdings when share prices decline. This observation may be explained by their well-informed view that the market undervalues their shares and by their long-term goals in the firm. During the bull market, they buy shares in an amount that is exactly sufficient to preserve their initial level control.

The results reported in Table 4 support the hypothesis that share price changes affect insider trading, and, to a lesser extent, the hypothesis of reversed causality. They also suggest that insider trading depends on general market conditions. Together with the results reported in Table 2, the analysis of causality based on the results reported in Tables 3 and 4 contradicts the hypothesis that majority insiders systematically trade around SEOs to derive short-term capital gains. Except for this finding, our evidence on the effect of market conditions on majority insider trading is generally inconsistent with the earlier hypotheses and evidence on the influence of signaling and growth opportunities on insiders' trading. Although we do not test causality at the level of the individual firm, we do show that in a bull market, majority insiders buy shares only in numbers sufficient to preserve their ownership ratio in the firm. This inconsistency with earlier hypotheses lends credibility to our main finding that the incentives of majority insiders are different than those of minority insiders (see, for example, Safieddine and Wilhelm (1996)). In bear and bull markets alike, they are willing to forego short-term capital gains to avoid dilution of their majority ownership.

5. Conclusion

This paper examines the phenomenon of SEO-related insider trading in a sample of firms whose insiders own more than 50% of the stock. We hypothesize that majority insiders trade on private information in order to preserve their share of ownership rather than to exploit opportunities for short-term capital gains. Our findings unambiguously support this hypothesis by demonstrating that majority insiders do trade around SEOs in order to avoid dilution of their ownership. Trading around SEOs depends on market conditions; in a bull market, they buy enough shares to maintain their ownership ratio, while in a bear market, they tend to buy more than the amount needed to preserve their control, thereby increasing their ownership ratio and supporting the market price. The results of additional tests conducted in this paper are consistent with earlier hypotheses in showing that stock price changes strongly affects insider trading around SEOs, while insider trading significantly affect share prices only when share prices are trending down. In such a case, they tend to buy additional shares, either to support declining share prices or to increase their control, in particular, if in their well-informed view, share prices are undervalued.

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