Life-cycle and Equity-Issue Announcement Effect

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Abstract

This present study investigates the announcement effect of seasoned equity offerings (SEOs) from the perspective of corporate life-cycle. Since SEO firms have distinct profitability prospect and fund-raising purposes in different current life-cycle stages, such information may be translated into different SEO announcement effects by the investors. Different from prior studies, the present study shows the value of an industry-adjusted method with continuous life-cycle stage measurement variables to analyze a sample of 1,495 public U.S. listed firms which announced equity issues in the period of 1991 to 2004. Empirical findings not only show the method here provides more objective, consistent, and significant results than those of the traditional pooled sample method with logistic variables but also verify our hypothesis that firms' current stages of life-cycle can be a major concern when the investors make their investment decisions. The impact of firms' life-cycle stages on short-term market reactions to firms' conduct of SEOs can be very different from that on the long-term ones.

Keywords: SEO; announcement effect; life-cycle

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1. Introduction

Announcements associate negatively with seasoned equity offerings (SEOs) (Asquith and Mullins, 1986; Denis, 1994; Jung, Kim, and Stulz, 1996; Kalay and Shimrat, 1987; Korajczyk, Lucas and McDonald, 1990; Mann and Sicherman, 1991). Myers and Majluf (1984) provide an explanation for this observation, claiming that because of information asymmetry between mangers and outside investors, managers use their information advantages to conduct SEOs when they know that their firms have no (or fewer) investment opportunities and are thus overvalued.

Therefore, whether a company has good investment opportunities or not, due to the adverse selection problem, rational outside investors will discount a firm's value when a firm announces its conduct of SEO. Hess and Bhagat (1986) find that information asymmetry costs the outside investors more with regard to the expenses associated with transactions and gathering information. These increased transaction and information costs reduce the outside investors' demand for the newly-issued equity and negatively affect a firm's stock price when a firm announces that it will undertake an SEO. Lee and Wu (2009) argue that if insiders know firms are undervalued, and an abnormal insider purchase occurs before equity selling. They suggest that insiders of equity selling firms have superior knowledge about future firm performance. This present study implies that information asymmetry exists between inside- and outside- investors. From a long-run performance perspective, Loughran and Ritter (1995) record that the SEO announcement effect negatively affects the post-abnormal return for several years after the offering. Accordingly, whether in the short-term or long-term, the negative announcement effect associated with SEOs is affected by the degree of information asymmetry, which causes the market to revise the stock price of the SEO firms downward.

However, some characteristics of firms or the information released might alleviate this

negative SEO announcement effect. Korajczyk, Lucas, and McDonald (1991) find that favorable information released before SEOs is able to mitigate the information gap between mangers and outside investors, and thus reduce the negative SEO impact. According to Korajczyk, Lucas, and McDonald's finding, if a firm has well-developed communication ability to clearly transfer the purpose of SEO to outside investors, the information asymmetry problem is mitigated, and the negative SEO impact is reduced. Using the stock return drift and net income growth ratio to measure the unanticipated growth, Harjoto and Garen (2003) document that firms with positive unanticipated growth have more incentive to conduct SEOs, and that such growth will positively affect the size of the offerings. Asquith and Mullins (1986) find that if the purpose of the SEO is to raise funds to undertake new investment plans, the market would view the offering positively. Similarly, Myers, and Majluf (1984) claim that a SEO firm receives a positive response if the main purpose of the SEO is for positive net-present-value (NPV) projects. Jensen (1986) also proposes that announcing the intention to conduct SEOs, firms with the characteristic of "high-profit-potential" receive a more positive reaction from the market, while the firms with the characteristic of "low-profit-potential" receive a negative one.

Asthana and Mishra (2001) and Han and Wild (2000) find that the several characteristics of firms affect the market reaction. They suggest that the larger firms have higher degree of informative earnings and thus receive positive reaction from market. These studies all suggest that outside investors can refer to some certain firm characteristics or information released to reduce information asymmetry. Based on the findings of these studies, the present study believes and hypothesizes that a firm's current stage of life-cycle, which is both a characteristic and a source of important information, might be a major concern to investors when making their investment decisions. Prior research does not investigate the relationship between the life-cycle theory and the SEO announcement effect.

This present study tests how firms' current life-cycle stages affect the market reactions on their SEO conduct. From a methodology perspective, when deciding the current life-cycle stages for the sample firms, this present study modifies the traditional pooled sample method by adjusting the industry effect. This present study claims that each industry has its own specific life-cycle pattern and the industry factor should be considered when the life-cycle stages of the sample firms are assigned. Different from the logistic variables for the life-cycle stages of the firms in previous studies, this present study proposes a method to generate continuous life-cycle stage measurement variables. With the methodology, this present study verifies the hypothesis by analyzing a sample of 1,495 public U.S. listed firms which announced equity issues in the period of 1991 to 2004. Eventual empirical findings not only show that methodology proposal provides more objective, consistent, and significant results than those of the traditional one but also indicate that a firm's current stage of life-cycle is indeed a major concern when the investors make their investment decisions.

Firms' current life-cycle stages affect the market reactions on their SEO conduct differently on short-term and long-term perspectives. In short-term investors' reactions to the stocks of SEO firms at different life-cycle stages seem to be explained by the old fashioned pecking order theory (Myers 1984). However, the "real-side" performances shown by the accounting measures (return-on-asset (ROA) ratios and return-on-equity (ROE) ratios) of SEO firms at different life-cycle stages verify our empirical findings from a long-term performance perspective.

2. Hypothesis Development

According to the corporate life-cycle theory, each company is like a human who develops from a young condition to an old condition. In general, the life-cycle model assumes that all firms go through growth, mature, and stagnant stages (Black, 1998). At each stage of their life-cycle, companies face different profitability and growth opportunities. In order to

keep their competitive advantages, companies develop their own operating strategies to exploit these opportunities no matter which industry they belong to. Therefore, different stages of life-cycle lead firms to develop different business plans, and then the outcomes of these plans will be reflected in their financial statements. Bender and Ward (2002) document that when a firm is in the creative or growth stage it focuses on developing new products or entering new market, and thus has high growth potential. However, when a firm is in the stagnant stage, it loses its rapid profitability and growth powers. Information related to these different stages is contained in a firm's financial statements and clearly observable by outsiders. Anthony and Ramesh (1992) investigate the stock market reaction to accounting performance measures in different stages of life-cycle, and use four classification variables (annual dividend rate, sales growth rate, capital expenditure rate, and age) for the life-cycle descriptors. They indicate that the young firms are more likely to develop new products to raise market share and attain higher sales growth. In order to keep high sales growth, such firms should expand their production scale and therefore need to invest more in the plants and equipment. Further, these early-stage firms would keep a relatively low dividend payout ratio to save capital for investing in upcoming positive NPV projects. Anthony and Ramesh's evidence suggests that investors' reactions on a firm's performance measures are a function of the firm's current life-cycle stage and implies that a firm's current life-cycle plays an important role in its market valuation.

This present study explores the association between the life-cycle theory and the SEO announcement effect. This present study believes that at different life-cycle stages SEO firms have different operating performances, and outcomes of these performances can be observed in their financial statements. Accordingly, this present study infers that investors will have different reactions when firms announce their conduct of SEOs, depending on the firms' current life-cycle stages. Without investigating a specific corporate event like this present

study, that is conduct of SEOs, Anthony and Ramesh (1992) find that generally firms in the growth (stagnant) stages of life-cycle obtain relatively positive (negative) reactions from the stock market. However, this present study does not predict a certain direction on the relation between the firms' current life-cycle stages and the market reactions toward their conduct of SEOs. This present study just neutrally hypothesize that firms' current life-cycle stages provide important information to investors and thus play an important factor to explain the market reactions to these firms' conduct of SEOs.

3. Data and Method

3.1. Data Selection

This present study include data collection on equity issues of public listed U.S. companies during the period of 1991 to 2004 from the Securities Data Corporation's (SDC) new issue database. SDC provides seasoned equity offering information on the filing date, issue size, and issue price. From this database, the originally selected sample includes 3,716 SEO cases (5,340 firm-year observations). For calculating abnormal returns (ARs) and cumulative abnormal returns (CARs), this present study obtains stock price, current-outstanding-shares, the year a firm was founded, and daily return from the CRSP database. For the firms' life-cycle descriptors, this present study collects capital expenditure ratio, long-term debt, total assets, net sales, market value, book value per share, dividend payout ratio, and sales growth rate from the COMPUSTAT database. The eventual observations are further selected through the following procedures. First, the SEOs must be conducted by U.S. firms with daily returns on CRSP at the announcement date during the five-day periods before and after their offerings. Second, the SEOs of firms must be traded on NYSE, AMEX, or NASDAQ. Third, the study excludes the original sample firms' with CUSIP numbers from 4900 to 4999 and from 6000 to 6999, which are financial services and

regulated utilities companies. Fourth, this present study eliminates the sample firms with missing filing dates and financial data in the SDC, COMPUSTAT, and CRSP databases. Fifth, in order to control extreme value effect, 1% of minimum and maximum value of abnormal return at announcement date is excluded. In the last step, this present study excludes sample firms with the economic sector code of 5000, which means that they are classified as part of the financial service industry. This present study makes this step in order to make sure that all financial related firms are all deleted. After the third step, still have three firms are not deleted and are defined as financial firms under the economic sector categorization in COMPUSTAT. After the selecting procedures, this present study includes a total of 1,495 firm-year observations from the original 5,340.

In Panel A of Table 1, this present study provides the yearly distribution of total SEO firm-year observations and gross proceeds. The mean of gross proceeds is about $73.88 million, and the mean percentage of the proceeds compared to the SEO firms' market value is about 23.00%. In Panel B of Table 1, this present study further categorizes our observations and gross proceeds from the economic sector perspective. In our sample, most observations are information technology (8000) firms (24.48% of total observations), and the telecommunication services (8600) firms account for the largest amount of gross proceeds ($85.88 million). The largest percentage of the proceeds to the firms' market value is the utility industry (9000), which is 33.08%. Table 1 provides important information of SEOs for our sample firms.

Table 1 here.

3.2. Method

This present study uses both univariate and multivariate analyses to test our hypothesis that firms' current stages of life-cycle are a major concern for investors when the firms announce their conduct of SEOs.

3.2.1. Univariate Analysis

In the univariate analysis, this present study tests the hypothesis by investigating abnormal returns (*AR* s) and cumulative abnormal returns (*CAR* s) of our sample firms' stocks. The SEO announcement period is defined as the five days before and after the announcement date, including the announcement date itself. Thus, the SEO announcement period is an eleven-day interval centered on the filing (announcement) date reported on SDC. Abnormal returns are defined as returns in excess of the value-weighted market returns in the eleven-day window, calculated as follow:

$$AR_t = R_{i,t} - R_{m,t}, \quad (1)$$

where, $R_{i,t}$ is the return of firm *i* at the time *t*, and $R_{m,t}$ is the value-weighted market return at the time *t*. Cumulative abnormal returns are defined as sum of the abnormal returns in the interval from the beginning date of observation window (t) to the ending date of observation window (T), and calculated as follow:

$$CAR_t = \sum_t^T (R_{i,t} - R_{m,t}). \quad (2)$$

In addition, when calculating *CAR* s, we use four intervals ((-1, +1), (-1, 0), (0, +1), and (-2, 2)) to measure the short-term announcement effect. Since the announcement date is time 0, "-1" means one day before the announcement date and "+1" means one day after the announcement date, and so forth. In order to achieve completion of the investigation, this present study also tests the hypothesis from a long-term performance perspective by computing the firms' buy-and-hold abnormal returns (*BHAR* s). *BHAR* is defined as the following:

$$BHAR_{i,T} = \prod_{t=1}^{T}(1+R_{i,t}) - \prod_{t=1}^{T}(1+R_{m,t})\,. \qquad (3)$$

As for the firms' life-cycle, this present study modifies Anthony and Ramesh's (1992) method to break it into three stages: growth, mature, and stagnant. The intention of this present study is to classify the sample SEO firms into these three stages to further investigate how the firms' current life-cycle stages impacts their SEO announcement effects. In Anthony and Remash's original classification of life-cycle stages, they use four descriptors: sales growth ratio, capital expenditure ratio, dividend payout ratio, and age.

This present study, however, only adopts three of them and excludes the dividend payout ratio for the classification procedure. The main reason for doing this is that in Table 2 the dividend payout ratios of our sample SEO firms in the lower, median, and upper quartiles are all zero. This finding shows that most SEO firms do not pay dividends to their shareholders, which makes sense intuitively. Since what SEO firms need most is capital, they would rather retain earnings for internal capital usage than pay earnings as dividends. Because of this reason the three life-cycle descriptors adopted in the stage classification of this present study procedure are: sales growth ratio (SG), capital expenditure ratio (CEV), and age of the firm (AGE). They are defined and computed as follow:

$$SG_t = \frac{SALES_t - SALES_{t-1}}{SALES_{t-1}} \times 100\,, \qquad (4)$$

$$CEV_t = \frac{CE_t}{VALUE_t} \times 100\,, \qquad (5)$$

$$AGE_t = FY - BY\,, \qquad (6)$$

where

$SALES_t$ is net sales in year *t*,

CE_t is capital expenditure in year *t*, and

$VALUE_t$ is market value of equity plus book value of long-term debt at the end of year *t*.

FY is the prior SEO filing year of the firm in CRSP database

BY is the beginning year of the firm in CRSP database

Table 2 here.

Table 3 describes the expectations of these life-cycle stage descriptors relating to the three life-cycle stages. The firms in the growth stages often have relatively higher sales growth ratios. Besides, in order to maintain their relatively higher sales growth, such firms require a relatively large amount of capital expenditure. Furthermore, firms in the growth stages of life-cycle are more likely to be younger than those in other stages.

Table 3 here.

This present study refines the life-cycle classification methodology in two aspects. First, in order to increase precision of the research method, different from the pooled life-cycle classification method in previous studies, this present study controls the industrial effect when the SEO firms are assigned to the different life-cycle stages. Second, instead of using logistic variables for the life-cycle stages as in previous studies, this present study proposes a continuous measuring variable.

The controlling industrial effect procedure is as follow. First, as in Panel B of Table 1, this present study categorizes the sample firms into nine relevant economic sectors (industries) by using their economic sector codes. Second, for each sector this present study ranks the

firms by the three classification variables (SGs, CEVs, and AGEs) and assign indicator scores to the firms following the orders in Table 3. For example, a firm with high SG (in the first 1/3 of its industry) is assigned a score of “one” to its sales growth variable. If the CEV of this same firm is in the medium level (in the middle 1/3 of its industry), a score of “two” is assigned to its capital expenditure variable. Third, this present study sums up the total scores of the three variables assigned to each firm and thus reclassify samples of this present study. If a firm is in the highest quintile of the total score in its sector, this present study classifies it as in its stagnant stage of life-cycle. In contrast, if a firm is in the lowest quintile, this present study classifies it as in it as in its growth stage of life-cycle. Finally, this present study regroups the firms into growth, mature, and stagnant stages and obtain industry-independent sample data. Different to previous studies, the present study claims that each economic sector (industry) has it specific type of life-cycle pattern.

Further, different from the logistic variables used in previous life-cycle related studies, this present study proposes a continuous measuring variable to measure the tendency of life-cycle. The continuous measuring procedure is as follow. First, this present study ranks all the firms for each economic sector group by the two classification variables (SG and CEV) from large to small and assign percentages (scores) to the firms. Second, again, this present study ranks the all firms for each economic sector group by the classification variable (AGE) from small to large and assign percentages (scores) to the firms. Finally, for each economic sector group, this present study sums up these three assigned percentages (scores) of all the firms, rank these firms from small to large and assign percentages (scores) to them. The continuous measuring variable this present study proposes for the life-cycle stages of the firms is defined as follow:

$$CON\_LC_{i,t} = \frac{LC_{i,t}}{\sum_{i=1}^{n} LC_{i,t}} \tag{7}$$

where

$CON\_LC_{i,t}$ is the tendency of firm i's current life-cycle stage in year t

$LC_{i,t}$ is sum of the total percentages (scores) of the three base classification variables assigned to firm i

$\sum_{i=1}^{n} LC_{i,t}$ is sum of the total percentages (scores) for *total* firms in the industry (economic sector) that firm i belongs to

n is the number of *total* firms in the industry (economic sector) that firm i belongs to

Instead of just including the sample firms (SEO firms), all of the firms in each industry should be considered when the ranking work in the assigning procedure is in process. Numbers of firms in the nine economic sectors are shown in Panel A of Table 4. If a firm is eventually assigned a larger percentage (score), the firm tends to be at the stagnant stage of life-cycle. In contrast, if a firm is eventually assigned a smaller percentage (score), the firm tends to be at the growth stage of life-cycle. After this procedure, all the sample SEO firms have their own life-cycle tendencies.

Table 4 here.

The comparison of the life-cycle stage classification results between using the proposed classification method and using the traditional classification method in previous studies is interesting. Figure 1 shows the results. Without surprise the classification of life-cycle stages for several companies can be very different under the two methods. For example, CUSIP number 73173810 (POLYMEDICA CORP) is classified as at the growth stage of life-cycle by the traditional classification method (pooled sample method). However, under the

proposed classification method (industry-adjusted method), this company is classified as a high tendency to its stagnant stage of life-cycle. Moreover, from Panel B of Table 4, the mean CEV (0.12) of firms classified to *stagnant* stages in the energy industry (4000) is equal to the mean CEV (0.12) of firms classified to *growth* stages in the consumer discretionary industry (2000). This fact points out that if this present study does not adjust the industry effect from the classification procedure the results would be easily biased since each industry does have its own specific pattern of life-cycle according to Panel B of Table 4. This fact also verifies the importance of the industry-adjustment in the classification procedure proposed by us.

Figure 1 about here.

3.2.2 Multivariate Analysis

In the multivariate analysis, this present study uses the OLS regression to capture the affection of sample firms' current life-cycle stages to their short-term stock performances. For the measurement of short-term stock performance, as mentioned earlier, this present study calculates the sample firms' ARs at the announcement date (AR_0) and CARs in the four time intervals ((-1, +1), (-1, 0), (0, +1), and (-2, 2)). For the major independent variable, this present study uses the proposed continuous measuring variable, $CON\_LC_{i,t}$, for the tendency of a firm's current life-cycle stage. Further, in order to compare the proposed continuous measuring method with the traditional logistic method, this present study also uses two dummy variables to proxy a firm's current life-cycle stage just like the method in Anthony and Ramesh (1992). If a sample firm is currently at the growth stage of life-cycle, D_1 is 1, and 0 otherwise. If a sample firm is currently at the stagnant stage of life-cycle, D_2 is 1, and 0 otherwise.

In each OLS regression, this present study follows the methodology in previous studies

(Bigelli, Mehrotra, Morck, and Yu, 1999; Krishnaswami and Subramaniam, 1999) and includes an array of five control variables. The first control variable is the market-to-book ratio (MB), which is used as a proxy for the growth potential and is defined as the stock price at filing date divided by the book value per share prior to the filing date. The second control variable, natural logarithm of total sales ($LN[SALES]$), is the proxy of firm size one-year prior to the filing date. The third control variable, sales growth ratio (SG), is defined as the net sales divided by the previous year's value of net sales minus one. The forth control variable, CEV , the measure of the capital expenditure ratio, is defined as the change in total fixed assets. The last control variable, AGE , the measure of the sample firms' age, is defined as the difference between current year and the year in which the business was originally formed. Also, in all the regressions, this present study controls year and industry fixed effect. The regression models are presented as follows:

$$STP = a_1 + b_1 D_1 + b_2 D_2 + b_3 MB_t + b_4 LN\left[SALES_t\right] + b_5 SG_t + b_6 CEV_t + b_7 AGE_t + \varepsilon_t \quad (8)$$

$$STP = c_1 + d_1 CON\_LC_t + d_2 MB_t + d_3 LN\left[SALES_t\right] + d_4 SG_t + d_5 CEV_t + d_6 AGE_t + \varepsilon_t \quad (9)$$

where

STP is $CAR(-1,0)$, $CAR(-1,+1)$, $CAR(0,+1)$, $CAR(-2,+2)$, and AR_0.

ε_t is the error term.

This present study also consider what the investors' eventual investment results would be, if they buy stocks based on the information of the equity-issued firms' life-cycle stages and hold these stocks for a longer time. This present study uses BHARs (Buy-and-Hold Abnormal Returns) at the 12th, 24th, and 36th months after the SEO month to proxy the long-run stock performances. In the long-run performance regressions, this present study not only uses the same dependent variables as in the short-term performance ones, but also

control year and industry fixed effect. Therefore, the long-term performance regressions are presented as follows:

$$BHAR_{t+j} = e_1 + f_1 D_1 + f_2 D_2 + f_3 MB_t + f_4 LN\left[SALES_t\right] + f_5 SG_t + f_6 CEV_t + f_7 AGE_t + \varepsilon_t \quad (10)$$

$$BHAR_{t+j} = g_1 + h_1 CON\_LC_t + h_2 MB_t + h_3 LN\left[SALES_t\right] + h_4 SG_t + h_5 CEV_t + h_6 AGE_t + \varepsilon_t \quad (11)$$

where j is 1, 2, and 3 years (12, 24, and 36 months).

4 Empirical Results

4.1 SEO Announcement Effect for All Sample Firms

Table 5 shows the short-term market reactions for the sample firms at the SEO announcement period, based on the eleven-day interval centered on the filing date. In Panel A of Table 5, mean ARs at day -1, day 0, and day +1 are -0.07, -1.42, and -0.89 respectively. Mean CARs are significant from the day -5 to day 5, except day -4. The short-term performances found here are significantly negative which support the findings of the existing literatures. That is, the information asymmetry between managers and shareholders results in negative market reactions when firms conduct SEOs (Asquith and Mullins, 1986; Denis, 1994; Mann and Sicherman, 1991). In Panel B of Table 5, the mean CARs in the short period (-1, 0), (-1, 1), (0, 1), and (-2, 2) are -1.49, -2.37, -2.30, and -2.17 and are significant respectively.

Table 5 here.

For the long-run performance, the mean $BHAR$s at the 12th, 24th, and 36th months after the SEO month are -6.83, -22.40, and -38.03 and are significant respectively. This result also

supports the finding of Loughran and Ritter (1995) that a firm will have several years of lower abnormal returns after issuing equity.

4.2 The Impact of a Firm's Life-Cycle on Its SEO Announcement Effect

This section examines whether or not firms' current life-cycle stages affect the market reactions to their SEO announcements. Table 6 classifies SEO firms into three life-cycle stages in order to better examine the SEO announcement effect.

Table 6 here.

The results show that firms at growth stages experience significantly severe negative market reactions than those at stagnant stages do from a short-run performance aspect. For example, in the interval (-1, 1), the mean *CAR* of firms at growth stages (-2.37) is worse than that of firms at stagnant stage (-2.15). However, from a long-run performance aspect, the results show that the firms at the growth stages yield higher *BHAR* s than those at the stagnant stages do. In Table 6, at the 12^{th} month, the mean *BHAR* of the firms at growth stages is -3.64, while that of the firms at stagnant stages is -9.44. We can also find a similar pattern in the cases of the 24^{th} and 36^{th} months.

This section also verifies that the market reactions are affected by the firms' current life-cycle stages instead of singly their "growth opportunities". Harjoto and Garen (2003) use the market-to-book ratio (*MB* ratio) to proxy firms' growth opportunities. They document that firms with positive unanticipated growth opportunities have more incentive to conduct SEOs. Nevertheless, this present study believes that the main factor which impacts the SEO announcement effect is the firms' current life-cycle stages instead of the firms' growth opportunities. From the explanation in the hypothesis development, this present study can

easily to distinguish the claim and Harjoto and Garen's. "Growth opportunities" are only part and not all of the concern when determining firms' current life-cycle stages. In order to test the claim of this present study, this present study first divides the pooled sample firms into two large groups according to their growth opportunities, the high and low *MB* groups. This present study then reclassifies the sample firms in each group according to their life-cycle stages.

In Table 7, in the high *MB* group, the mean *CAR*s of firms in the stagnant stages are still higher than those of the firms at growth stages. In the window (-1, 1) of the high *MB* group, the mean *CAR* of the firms in stagnant stages is -2.18, while that of firms in growth stages is -2.42. In the low *CAR* group, the *CAR*s of firms in stagnant stages in window (-1, 0) and (-1, 1) are still higher than those of the firms in growth stages. For example, the mean *CAR* in window (-1, 0) of the firms in their stagnant stages is -1.13 while the mean CAR in the same event window of firms in their growth stage is -1.67. With regard to the short-term performance aspect, both high and low *MB* groups generally show the same trend.

Table 7 here.

As for the long-term performance aspect, table 7 shows that the *BHAR* patterns of the 12th, 24th, and 36th months are the same in the both high *MB* and low *MB* groups. In the 36th month window of the high *MB* group, the mean *BHAR* of the firms at stagnant stages is -36.21, while that of the firms at growth stage is -35.22. Further, in the 36th month window of the low MB ratio group, the mean BHAR of the firms at stagnant stages is -82.96, while that of the firms at growth stages is -61.69. With regard to the long-term performance aspect, both high and low *MB* groups show the same trend.

The findings in Table 6 and 7 thus support the claim of this present study , that the main factor which impacts the SEO announcement effect is the firms' current stages of life-cycle, not its growth opportunities. This also supports the finding of Anthony and Ramesh (1992), indicating that a firm's current life-cycle stage plays an important role in the investor' decision makings.

4.3 Robustness Test

In order to confirm the findings in the former section, this present study conducts a robustness test. Table 7 shows that the combination of the sample firms at the same stages of life-cycle in the two different *MB* groups (high *MB* and low *MB* groups), and these figures are shown in Table 8. From the short-term performance aspect, the firms at stagnant stages obtain better market reactions than those at growth stages. For example, in the window (-1, 1), the mean *CAR* of the growth stage firms is -2.37, while that of the stagnant stage firms is -2.18. However, from the long-run performance aspect, firms at growth stages obtain higher mean *BHAR*s than those at stagnant stages. For example, at the 24th month after the SEO month, the mean *BHAR* of firms at growth stages is -17.74, while that of the stagnant stages firms is -27.40.

Table 8 here.

Consequently, the results in Table 8 again validate our findings in Table 6 and Table 7. In summary, in a short-term performance perspective, the SEO firms at stagnant stages obtain relatively less negative market reactions than those at growth stages do. However, in a long-term performance perspective, the SEO firms at growth stages obtain relatively less negative market reactions than those at stagnant stages do.

4.4 Multivariate Regressions Analysis

This present study further uses OLS regressions to verify the hypothesis. The results of SEO firms' short-run stock performances are shown in Table 9. Using the traditional logistic variable method, coefficients on D_2 are significantly positive in most cases; however, coefficients on D_1 in all cases are insignificantly positive or negative. If the proposed continuous measuring variable method is used, the results show that coefficients on variable CON_LC are all significantly positive in the short-term observation intervals. In order to correspond with what Table 6, Table 7, and Table 8 show, the sign of D_1 is supposed to be negative, the sign of D_2 is supposed to be negative, and the sign of CON_LC is supposed to be positive.

Table 9 here.

Table 9 clearly shows that the proposed method provides more consistent and significant results than those of the traditional method. For the control variables in Table 9, all the coefficients on MB are close to 0 which means that the market reaction to firms' growth opportunities is trivial when firms' current life-cycle stages are concerned. This finding supports our claim in the former section that the main factor which impacts the SEO announcement effect is the firms' current life-cycle stages instead of the firms' growth opportunities. Further, Table 9 shows that firms' current life-cycle stages are a main consideration when investors make their short-term investment decisions.

This present study also examines the impact of SEO firms' current life-cycle stages to their long-run stock performances. In the univariate analysis, the results indicate that the firms at growth stages show better $BHAR$s than those at stagnant stages do. This present study uses OLS regressions to verify this relationship as well. In Table 10, if the traditional

logistic variable method is adopted, the coefficients on D_1 at the 12^{th} month $BHAR$ and at the 24^{th} month $BHAR$ (12.91 and 16.77 respectively) are significantly positive. However, coefficients on D_2 at the 12^{th}, 24^{th}, and 36^{th} month $BHAR$s are insignificantly positive or negative. If the proposed continuous measuring variable method is used, the results show that coefficients on variable CON_LC (-0.28, -0.38, and -0.48 respectively) are all significantly negative in the long-term observation intervals. In order to correspond with what this present study indicates in Table 6, Table 7, and Table 8, the sign of D_1 is supposed to be positive, the sign of D_2 is supposed to be negative, and the sign of CON_LC is supposed to be negative.

Table 10 here.

Again, Table 10 indicates the advantage of applying our proposed method by showing that the proposed method provides more consistent and significant results than those of the traditional method. In summary, combining the empirical results in Table 9 and Table 10, this present study finds that firms' current life-cycle stages play a dominant role in explaining market reactions to firms' conduct of SEOs.

4.5 Explanation of Empirical Findings

Summarizing the empirical findings in both univariate and multivariate analyses, this present study observes that the impact of firms' life-cycle stages on short-term market reactions to firms' conduct of SEOs can be very different from that on the long-term ones. According to the findings, in a short-term performance perspective the SEO firms at stagnant stages obtain relatively less negative market reactions than those at growth stages do, while in a long-term performance perspective the SEO firms at growth stages obtain relatively less

negative market reactions than those at stagnant stages do. Although the findings have already shown that firms' current life-cycle stages do play a dominant role in explaining market reactions to firms' conduct of SEOs, how does this present study explain these different investors' reactions in the different observation lengths of time?

For the short-term performance perspective, the old fashioned pecking order theory (Myers 1984) seems to provide a good explanation for our findings. Under the existence of information asymmetry, the pecking order theory suggests that firms always prefer internal financing (retained earnings) to external financings of any sort, debt or equity. If firm must obtain external financing, they choose the safest security first, and their last choice is to issue common stocks. Therefore, according to the theory, undoubtedly the investors would act negatively toward these SEOs because the investors would think that these SEO firms which can only pick the last choice, equity issuance, must bear some financial problems. This inference corresponds with what this present study shows that all short-term stock performances for our sample firms are all negative. Further, following the logic of the theory, this present study clearly indicates that firms at growth stages obtain relatively more negative market reactions than those at stagnant stages do because the firms at growth stages are supposed to have relatively more abilities to do self-funding and are presumed to be least possible to choose equity financing. Announcements of conducting SEOs by the firms at growth stages actually deeply disappoint the investors' expectations. Consequently, the SEO firms at growth stages obtain relatively more negative market reactions than those at stagnant stages do.

Then, how about the observation for the long-term performances of our sample firms? Why do the SEO firms at growth stages obtain relatively less negative market reactions than those at stagnant stages? The "real-side" performances of the sample firms shown by their accounting measures, ROAs and ROEs, provide the explanation. Table 11 shows that ROAs

and ROEs of firms at growth stages outperform those of firms at stagnant stages in all three long-term observation periods. According to the findings from these real-side accounting measures, the SEO firms at growth stages should obtain relatively more positive market reactions than those at stagnant stages do.

Table 11 here.

5. Conclusion

This present study examines the impact of firms' current life-cycle stages to market reactions on these firms' conduct of SEOs by analyzing a sample of 1,495 public equity issues announced by U.S. listed firms in the period of 1991 to 2004. The contributions of this present study are in the following aspects. First, different from previous life-cycle theory related studies, this present study not only adjust the industry for our sample firms in the classification procedure but also propose a continuous measuring variable for the tendency of firms' life-cycle. Eventual empirical findings show that the proposed methodology provides more objective, consistent, and significant results than those of the traditional method. Second, the empirical findings support the finding in many previous studies that market reactions to firms' announcement of conducting SEOs are negative. Third, this present study verify the hypothesis by showing that firms' current life-cycle stages play a dominant role in explaining market reactions to firms' conduct of SEOs. More interestingly, this present study also observes that in a short-term performance perspective the SEO firms at stagnant stages obtain relatively less negative market reactions than those at growth stages do, while in a

long-term performance perspective the SEO firms at growth stages obtain relatively less negative market reactions than those at stagnant stages do. For the short-term performance perspective, the old fashioned pecking order theory provides a good explanation for the findings. For the long-term performance perspective, the fact that the real-side accounting measures for performances, ROAs and ROEs, of firms at growth stages outperform those of firms at stagnant stages provides another good explanation for the findings of this present study.

References

Anthony JH, Ramesh K. Association between accounting performance measures and stock prices. Journal of Accounting and Economics 1992; 15(2-3): 203-227.

Asquith P, Mullins W. Equity issues and offering dilution. Journal of Financial Economics 1986; 15(1): 61-89.

Asthana SC, Mishra BK. The differential information hypothesis, firm size, and earnings information transfer: An empirical investigation. Journal of Business Research 2001; 53(1): 37-47.

Begelli M, Mehrotra V, Morck R, YuW. Changes in management ownership and the valuation effects of equity offerings. Journal of Management and Governance 1999; 2(4): 297-309.

Bender R, Ward K. Corporate Financial Strategy. MA: Butterworth-Heinemann; 2002.

Black EL. Life-cycle impacts on the increment value relevance of earnings and cash flow measure. Journal of Financial Statement Analysis 1998; 4(1): 40-56.

Denis DJ. Investment opportunities and the market reaction to equity offerings. *Journal of Financial and Quantitative Analysis* 1994. 29(2): 159-177.

Han JCY, Wild JJ. Predisclosure information, firm capitalization, and earnings information transfers. Journal of Business Research 2000; 49(3): 273-288.

Harjoto M, Garen J. Why do IPO firms conduct primary seasoned equity offerings? Financial Review 2003; 38(1): 103-125.

Hess AC, Bhagat S. Size effects of seasoned stock issues: Empirical evidence. Journal of Business 1986; 59(4): 567-584.

Jensen M. Agency costs of free cash flow, corporate finance, and takeovers. American Economic Review 1986; 76(2) 323-329.

Jung K, Kim YC, Stulz R. Timing, investment opportunities, managerial discretion, and the

security issue decision. Journal of Finance and Economics 1996; 42(2): 159-186.

Kalay A, Shimrat A. Firm value and seasoned equity issues: Price pressure, wealth redistribution or negative information. Journal of Financial Economics 1987; 19(1): 109-126.

Korajczky RA, Lucas RJ, McDonald RL. Equity issue with time-varying asymmetric information. Journal of Financial and Quantitative Analysis 1992; 27(3): 397-417.

Krishnaswami S, Subramaniam V. Information asymmetry, valuation, and the corporate spinoff decision. Journal of Financial Economics 1999; 53(1): 73-112.

Lee CF, Wu YL. Two-stage models for the analysis of information content of equity-selling mechanisms choices. Journal of Business Research 2009; 62 (1): 123-133.

Loughran T, Ritter JR. The new issues puzzle. Journal of Finance 1995; 50(1): 23-51.

Mann SV, Sicherman NW. The agency costs of free cash flow: Acquisition activity and equity issues. Journal of Business 1991; 64(2): 213-217.

Myers SC, Majluf NS. Corporate financing and investment decisions when firms have information that investors do not have. Journal of Financial Economics 1984; 13(2): 187-221.

Myers SC. The capital structure puzzle. Journal of Finance 1984; 39(3): 575-592.

Table 1 Summary of SEO Sample Size and Gross Proceeds

Panel A: Yearly Distribution of SEO Sample Size and Gross Proceeds

Year	Sample Size	Percentage of sample (%)	Gross proceeds ($ million)	Gross proceeds / market value (%)
1991	89	5.95	35.01	24.79
1992	78	5.22	35.88	21.80
1993	120	8.03	46.70	27.22
1994	76	5.08	55.55	21.56
1995	151	10.10	59.42	21.84
1996	158	10.57	69.72	26.03
1997	129	8.63	61.98	24.09
1998	97	6.49	78.24	27.30
1999	99	6.62	87.41	21.24
2000	90	6.02	164.23	17.04
2001	77	5.15	87.58	21.03
2002	78	5.22	81.42	18.74
2003	126	8.43	92.68	20.30
2004	127	8.49	86.07	22.96
Total	1,495	100	-	-
Mean	-	-	73.88	23.00%

Panel B: Economic Sector Distribution of SEO Sample Size and Gross Proceeds

Economic Sector	Sample size	Percentage of sample (%)	Gross proceeds ($ Millions)	Gross proceeds /market value (%)
Materials (1000)	52	3.48	69.69	27.30
Consumer Discretionary (2000)	329	22.01	66.54	24.06
Consumer Staples (3000)	37	2.47	54.40	29.17
Health Care (3500)	335	22.41	80.74	19.66
Energy (4000)	139	9.30	70.88	28.21
Industrials (6000)	212	14.18	62.42	23.10
Information Technology (8000)	366	24.48	84.48	20.80
Telecommunication Services (8600)	16	1.07	85.88	27.51
Utilities (9000)	9	0.60	55.57	33.08
Total	1,495	100.00	-	-
Mean	-	-	73.88	23.00%

Note: The sample consists of 1,495 SEOs during the 1991-2004 period. The summary reports the sample size, percentage of sample, the mean gross proceeds, and mean ratio of gross proceeds to firm size (gross proceeds/market value at the filing date).

Table 2 Descriptive Statistics of Life-cycle Descriptors

Variable	Mean	STD	Q_1	Median	Q_3
Market Value ($ million)	518.57	989.18	141.26	299.66	589.40
Capital Expenditure ($ million)	18.07	33.14	1.86	6.63	19.64
Long-term Debt ($ million)	53.19	94.66	0.38	8.79	61.46
Total Assets ($ million)	209.01	218.37	54.08	121.74	291.58
Net Sales ($ million)	197.08	217.31	34.01	112.17	281.14
Market-to-Book Ratio (Times)	12.29	88.79	3.09	5.94	14.00
Dividend Payout ($ million)	6.26	33.73	0.00	0.00	0.00
AGE (Year)	5.66	6.12	1.00	3.00	7.00
SG (%)	0.35	0.67	0.05	0.22	0.47
CEV (%)	0.06	0.09	0.01	0.03	0.08

Note: “Market Value” is defined as the stock price at the filing date multiplied by current –outstanding shares. “Capital Expenditure” is defined as the firms funds used for the construction and/or acquisition of property, plants, and equipment. “Long-term Debt” is represents debt obligations due more than one year from the company’s balance sheet date. “Total Assets” is defined as current assets plus net property, plants, and equipment plus other noncurrent assets. “Net Sales” represent gross sales minus cash discounts, trade discounts, and returned sales and allowances for which credit is given to customers. “Market-to-Book Ratio” is used as a proxy for the growth potential, and is defined as the stock price at filing date divided by the book value per share prior to the filing date. “Dividend Payout” is defined as the total dollar amount of dividends declared on the common stock, divided by Income Before Extraordinary Items-Adjusted For Common Stock Equivalents, which represents income before extraordinary times and discontinued operations less preferred dividend requirements. “AGE” presents that prior SEO filing year reduce beginning year in CRSP database. “SG” is defined as the ratio of the change in current and prior net sales divided by prior net sales. “CEV” is defined as the capital expenditure divided by firm’s value, which is calculated by market value of equity plus the book value of long-term debt at the end of the year.

Table 3 Expectations for Firm-specific Descriptors of Life Cycle Stages

	Life-cycle Descriptors		
Life-cycle Stages	SG	CEV	AGE
Growth	High	High	Young
Mature	Medium	Medium	Adult
Stagnant	Low	Low	Old

Note: This table describes the expectations of these life-cycle stage descriptors relating to the three life-cycle stages. The firms in the growth stages often have relatively higher sales growth ratios. Besides, in order to maintain their relatively higher sales growth, such firms require a relatively large amount of capital expenditure. Furthermore, firms in the growth stages of life-cycle are more likely to be younger than those in other stages.

Table 4 Information of Total Firms in Each Sector

Panel A: Number of Firms in Each Economic Sector	
Economic Sector	n, the number of firms
Materials (1000)	3,565
Consumer Discretionary (2000)	12,068
Consumer Staples (3000)	3,378
Health Care (3500)	7,761
Energy (4000)	2,943
Industrials (6000)	9,272
Information Technology (8000)	12,517
Telecommunication Services (8600)	728
Utilities (9000)	1,158

Note: By following Anthony and Ramesh's (1992) method, we classify the whole listed firms into three life-cycle stages by economic sectors. Panel B of Table 4 shows the mean value of three life-cycle descriptors in each life-cycle stage. The same mean value of descriptors in different economic sectors would be classified different life-cycle stages. For example, the mean CEV of firms classified to stagnant stages in the energy industry (4000) is equal to the mean CEV (0.12) of firms classified to growth stages in the consumer discretionary industry (2000). This fact points out that if we do not adjust the industry effect from our classification procedure the results would be easily biased since each industry does have its own specific pattern of life-cycle according to Panel B of Table 4. This fact also verifies the importance of the industry-adjustment in the classification procedure proposed by us.

Panel B: Mean and Number of Firms on the Three Life-cycle Descriptors in Each Economic Sector										
Economic Sector		Growth Stage	Mature Stage	Stagnant Stage	Growth Stage	Mature Stage	Stagnant Stage	Growth Stage	Mature Stage	Stagnant Stage
		SG			CEV			AGE		
1000	Mean	**0.37**	**0.12**	**0.00**	**0.20**	**0.15**	**0.06**	**4.99**	**11.37**	**19.48**
	Number of Firms	1,351	831	1,383	1,351	831	1,383	1,351	831	1,383
2000	Mean	**0.38**	**0.14**	**0.00**	**0.12**	**0.09**	**0.04**	**3.70**	**8.86**	**16.32**
	Number of Firms	4,689	2,716	4,663	4,689	2,716	4,663	4,689	2,716	4,663
3000	Mean	**0.25**	**0.09**	**0.02**	**0.19**	**0.10**	**0.04**	**4.51**	**10.10**	**19.37**
	Number of Firms	1,300	807	1,271	1,300	807	1,271	1,300	807	1,271
3500	Mean	**0.73**	**0.36**	**0.02**	**0.08**	**0.14**	**0.03**	**2.68**	**7.23**	**10.31**
	Number of Firms	2,881	1,997	2,883	2,881	1,997	2,883	2,881	1,997	2,883
4000	Mean	**0.72**	**0.25**	**0.04**	**0.42**	**0.24**	**0.12**	**3.48**	**8.01**	**13.15**
	Number of Firms	1,103	675	1,165	1,103	675	1,165	1,103	675	1,165
6000	Mean	**0.38**	**0.12**	**0.01**	**0.20**	**0.09**	**0.05**	**4.94**	**12.04**	**18.81**
	Number of Firms	3,452	2,248	3,572	3,452	2,248	3,572	3,452	2,248	3,572
8000	Mean	**0.65**	**0.20**	**0.02**	**0.19**	**0.08**	**0.27**	**2.75**	**7.41**	**11.98**
	Number of Firms	4,653	3,246	4,618	4,653	3,246	4,618	4,653	3,246	4,618
8600	Mean	**0.72**	**0.26**	**0.07**	**0.54**	**0.20**	**0.11**	**1.97**	**4.59**	**6.41**
	Number of Firms	279	178	271	279	178	271	279	178	271
9000	Mean	**0.29**	**0.13**	**0.02**	**0.13**	**0.09**	**0.07**	**7.15**	**12.57**	**17.83**
	Number of Firms	426	317	415	426	317	415	426	317	415

Table 5 SEO Announcement Effect for All Sample Firms

Panel A: Short-term Market Reaction for SEO Firms						
Date	AR	t-value	n	CAR	t-value	n
-5	0.19**	1.94	1,495	0.19**	1.94	1,495
-4	0.02	0.21	1,495	0.21	1.56	1,495
-3	0.16*	1.64	1,495	0.37**	2.35	1,495
-2	0.08	0.80	1,495	0.44***	2.46	1,495
-1	-0.07	-0.85	1,495	0.37*	1.89	1,495
0	-1.42***	-15.06	1,495	-1.04***	-5.12	1,495
1	-0.89***	-7.88	1,495	-1.93***	-8.70	1,495
2	0.13	1.33	1,495	-1.80***	-7.40	1,495
3	0.12	1.24	1,495	-1.68***	-6.62	1,495
4	0.18*	1.89	1,495	-1.50***	-5.57	1,495
5	0.37***	3.74	1,495	-1.14***	-3.96	1,495

Panel B: Short-term and Long-run Market Reactions for SEO Firms			
windows	Return	t-value	n
CAR (-1, 0)	-1.49***	-13.37	1,495
CAR (-1, 1)	-2.37***	-15.97	1,495
CAR (0, 1)	-2.30***	-16.47	1,495
CAR (-2, 2)	-2.17***	-11.18	1,495
$BHAR_{t+1}$	-6.83***	-3.10	1,495
$BHAR_{t+2}$	-22.40***	-6.93	1,410
$BHAR_{t+3}$	-38.03***	-7.12	1,316

Note: Abnormal returns (ARs) are defined as returns in excess of the value-weighted market returns over the eleven-day window. The cumulative abnormal returns (CARs) we calculate are the sum of the abnormal returns in the interval from time t to time T. We use four intervals ((-1, +1), (-1, 0), (0, +1), and (-2, 2)) to measure the short-term announcement effect. We also use BHARs in the first, second, and third year after the announcement year to measure the long-term performance. ***, **, and * represent significance at the 1%, 5%, and 10% levels, respectively.

Table 6 Life-cycle Effects on Short-term and Long-run Market Reactions for SEO Firms

Windows	Growth			Mature			Stagnant		
	CAR	t-value	n	CAR	t-value	n	CAR	t-value	n
CAR (-1, 0)	-1.55 ***	-10.09	750	-1.83 ***	-7.93	372	-1.01 ***	-4.57	373
CAR (-1, 1)	-2.37 ***	-11.45	750	-2.61 ***	-8.26	372	-2.15 ***	-7.48	373
CAR (0, 1)	-2.27 ***	-11.63	750	-2.45 ***	-8.12	372	-2.23 ***	-8.41	373
CAR (-2, 2)	-2.08 ***	-7.88	750	-2.53 ***	-6.18	372	-1.98 ***	-5.02	373
$BHAR_{t+1}$	-3.64	-1.09	750	-10.66 **	-2.38	372	-9.44 ***	-2.64	373
$BHAR_{t+2}$	-14.76 ***	-2.99	707	-30.11 ***	-4.84	349	-30.04 ***	-5.42	354
$BHAR_{t+3}$	-33.92 ***	-5.58	657	-34.77 **	-2.30	333	-49.66 ***	-5.68	326

Note: ***, **, and * represent significance at the 1%, 5%, and 10% levels, respectively.

Table 7 Growth Potential and Life-cycle Effects on Short-term and Long-run Market Reaction for SEO Firms

High MB Ratio									
Windows	Growth			Mature			Stagnant		
	Mean	t-value	n	Mean	t-value	n	Mean	t-value	n
CAR (-1, 0)	-1.45***	-8.42	601	-1.72***	-6.69	300	-1.16***	-4.42	289
CAR (-1, 1)	-2.42***	-10.85	601	-2.49***	-7.26	300	-2.18***	-6.21	289
CAR (0, 1)	-2.36***	-11.28	601	-2.41***	-7.35	300	-2.26***	-6.96	289
CAR (-2, 2)	-2.13***	-7.53	601	-2.37***	-5.17	300	-1.98***	-4.13	289
$BHAR_{t+1}$	-3.01	-0.77	601	-5.46	-1.02	300	-7.35*	-1.77	289
$BHAR_{t+2}$	-14.35***	-2.69	570	-22.75***	-3.05	282	-23.23***	-3.64	273
$BHAR_{t+3}$	-35.22***	-5.11	540	-19.60	-1.06	266	-36.21***	-3.66	257
Low MB Ratio									
Windows	Growth			Mature			Stagnant		
	Mean	t-value	n	Mean	t-value	n	Mean	t-value	n
CAR (-1, 0)	-1.67***	-5.07	156	-2.02***	-3.98	80	-1.13***	-2.59	69
CAR (-1, 1)	-2.20***	-4.38	156	-2.81***	-4.39	80	-2.18***	-3.46	69
CAR (0, 1)	-2.08***	-4.17	156	-2.12***	-4.05	80	-2.25***	-3.72	69
CAR (-2, 2)	-2.10***	-3.28	156	-2.44***	-3.12	80	-2.24***	-2.63	69
$BHAR_{t+1}$	-14.06***	-2.70	156	-15.52*	-1.84	80	-17.49**	-2.40	69
$BHAR_{t+2}$	-31.10***	-2.91	145	-43.54***	-3.67	72	-44.17***	-3.24	68
$BHAR_{t+3}$	-61.69***	-5.05	127	-56.54***	-3.37	67	-82.96***	-4.42	59

Note: ***, **, and * represent significance at the 1%, 5%, and 10% levels, respectively.

Table 8 Robustness Test: Growth Potential and Life-cycle Effects on Short-term and Long-run Market Reaction for SEO Firms

Windows	Growth			Mature			Stagnant		
	CAR	t-value	n	CAR	t-value	n	CAR	t-value	n
CAR (-1, 0)	-1.49***	-9.80	757	-1.78***	-7.78	380	-1.16***	-5.07	358
CAR (-1, 1)	-2.37***	-11.59	757	-2.56***	-8.47	380	-2.18***	-7.08	358
CAR (0, 1)	-2.30***	-11.79	757	-2.35***	-8.36	380	-2.26***	-7.88	358
CAR (-2, 2)	-2.12***	-8.16	757	-2.39***	-6.01	380	-2.03***	-4.83	358
$BHAR_{t+1}$	-5.29	-1.61	757	-7.58*	-1.65	380	-9.30***	-2.56	358
$BHAR_{t+2}$	-17.74***	-3.71	715	-26.97***	-4.20	354	-27.40***	-4.73	341
$BHAR_{t+3}$	-40.26***	-6.65	667	-27.03*	-1.79	333	-44.93***	-5.09	316

Note: ***, **, and * represent significance at the 1%, 5%, and 10% levels, respectively.

Table 9 Multivariate Regressions Explaining the Life-cycle Effect on Short-term Market Reaction for SEO Firms

Variable	(-1, 0)	(-1, 1)	(0, 1)	(-2, 2)	AR_0	(-1, 0)	(-1, 1)	(0, 1)	(-2, 2)	AR_0
D_1	0.08	-0.14	-0.14	0.00	0.09					
	(0.28)	(-0.35)	(-0.36)	(0.00)	(0.35)					
D_2	1.00***	0.82*	0.55	0.81	0.72***					
	(2.97)	(1.83)	(1.29)	(1.38)	(2.55)					
CON_LC						0.01*	0.02**	0.02**	0.02**	0.01*
						(1.89)	(2.16)	(1.94)	(1.98)	(1.70)
MB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(0.28)	(-0.85)	(-0.30)	(-0.73)	(1.24)	(0.40)	(-0.79)	(-0.25)	(-0.68)	(1.34)
LN[SALES]	0.08	0.09	0.06	-0.02	0.05	0.07	0.11	0.08	0.01	0.04
	(0.97)	(0.85)	(0.57)	(-0.12)	(0.65)	(0.86)	(0.94)	(0.71)	(0.07)	(0.59)
SG	0.16	0.06	0.00	0.53*	0.10	0.18	0.17	0.11	0.73**	0.13
	(0.86)	(0.24)	(0.00)	(1.67)	(0.64)	(0.93)	(0.63)	(0.46)	(2.13)	(0.78)
CEV	1.94	2.94	2.26	2.78	1.26	2.39	3.98**	3.26*	4.45*	1.68
	(1.37)	(1.55)	(1.27)	(1.12)	(1.06)	(1.56)	(1.94)	(1.69)	(1.66)	(1.30)
AGE	0.00	-0.05*	-0.06**	-0.02	-0.01	0.00	-0.06**	-0.07***	-0.05	-0.01
	(-0.12)	(-1.72)	(-2.14)	(-0.59)	(-0.62)	(-0.12)	(-1.97)	(-2.45)	(-1.14)	(-0.67)
Adjusted R^2	0.01	0.01	0.01	0.00	0.02	0.01	0.01	0.01	0.00	0.01
F-statistic	1.69***	1.45*	1.41*	1.13	1.87***	1.52**	1.50**	1.51**	1.24	1.79***
Probs. (F-statistic)	(0.01)	(0.06)	(0.08)	(0.29)	(0.00)	(0.04)	(0.05)	(0.04)	(0.19)	(0.01)

Note: ***, **, and * represent significance at the 1%, 5%, and 10% levels, respectively.

Table 10 Multivariate Regressions Explaining Life-cycle Effect on Long-term Market Reaction for SEO Firms

Variable	$BHAR_{t+1}$	$BHAR_{t+2}$	$BHAR_{t+3}$	$BHAR_{t+1}$	$BHAR_{t+2}$	$BHAR_{t+3}$
D_1	12.91**	16.77**	11.37			
	(2.16)	(1.93)	(0.84)			
D_2	5.98	2.13	-13.10			
	(0.89)	(0.22)	(-0.86)			
CON_LC				-0.28**	-0.38***	-0.48*
				(-2.21)	(-2.08)	(-1.69)
MB	0.02	0.02	0.09	0.02	0.03	0.09
	(0.87)	(0.66)	(1.57)	(0.96)	(0.72)	(1.55)
LN[SALES]	1.58	5.21**	9.25**	0.89	4.53*	8.81**
	(0.91)	(2.07)	(2.37)	(0.51)	(1.79)	(2.24)
SG	-6.84*	-10.79*	-14.26*	-9.78**	-13.84**	-17.21*
	(-1.78)	(-1.92)	(-1.64)	(-2.37)	(-2.30)	(-1.84)
CEV	-11.68	6.23	-51.74	-33.35	-17.74	-79.37
	(-0.39)	(0.14)	(-0.77)	(-1.03)	(-0.38)	(-1.08)
AGE	-0.48	-1.02	-0.55	-0.13	-0.69	-0.25
	(-1.09)	(-1.59)	(-0.55)	(-0.28)	(-1.00)	(-0.24)
Adjusted R^2	0.10	0.12	0.11	0.10	0.12	0.11
F-statistic	6.01***	6.98***	6.60***	6.24***	7.26***	6.87***
Probs. (F-statistic)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

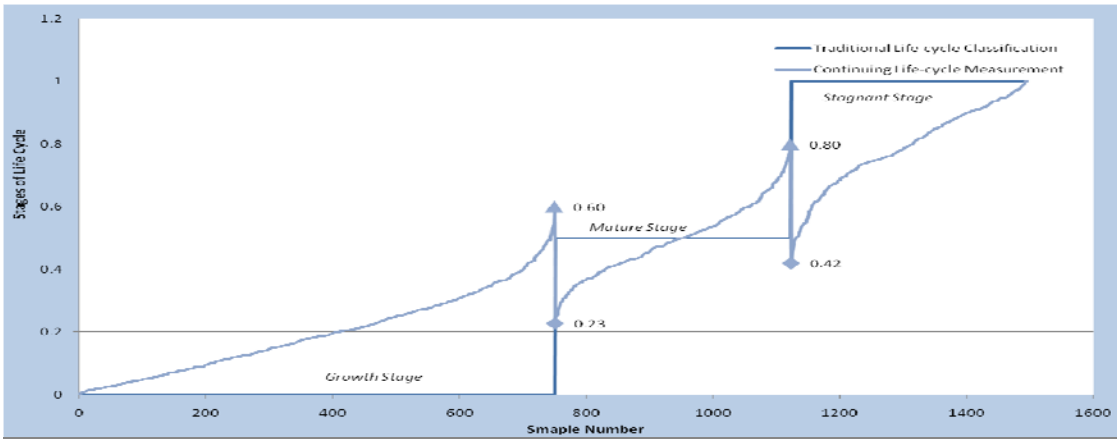
Note: ***, **, and * represent significance at the 1%, 5%, and 10% levels, respectively.

Table 11 Life-cycle Effects on Long-run Accounting Performance for SEO Firms

Windo	Growth			Mature			Stagnant		
ws	CAR	t-value	n	CAR	t-value	n	CAR	t-value	n
ROA_{t+1}	1.78 ***	3.36	750	-0.65	-0.61	372	-4.01 ***	-3.68	373
ROA_{t+2}	0.63	0.81	730	-1.82	-1.34	361	-5.65 ***	-3.85	362
ROA_{t+3}	-2.15 **	-2.25	681	-3.28 ***	-2.61	340	-6.38 ***	-4.50	341
ROE_{t+1}	2.63 **	2.21	750	0.53	0.23	372	-5.93 ***	-2.49	373
ROE_{t+2}	-0.45	-0.31	728	-4.48	-1.15	355	-10.73 ***	-3.03	360
ROE_{t+3}	-5.25 **	-2.44	671	-9.34 **	-2.32	333	-12.37 ***	-4.06	336

Note: ***, **, and * represent significance at the 1%, 5%, and 10% levels, respectively.

Figure 1 Comparison of Our Proposed Classification Method and Traditional Classification Method



Note: Figure 1 shows that the different classification result under traditional logistic variable method and continuous measuring variable method. For example, when the observation is classified as growth stage firm, its score of continuous measuring variable method is 0.60. However, the next observation's score of continuing life-cycle measurement is 0.23 which is classified as mature stage firm under traditional logistic variable method. The same scenario is also at stagnant stage under traditional logistic variable method.