The Performance of Seasoned Equity Issues in a Risk-Adjusted Environment?

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EXTENDED ABSTRACT

We show that firms issuing seasoned equity possess unique risk characteristics as captured by beta. We use a benchmark to control for this risk and then measure the extent of risk-adjusted under-performance using a longer time-frame than the five-year period used in most studies. We examine the impact of various factors on post-issue performance as well as initial issue underpricing.

Why do companies making seasoned equity offerings (SEOs) significantly under-perform in the post-issue period? Loughran and Ritter (1997) suggested transitory over-pricing prior to issue, or agency and information costs, Healy and Palepu (1990) and Masulis and Korwar (1986). Rangan (1997) and Teoh, Welch and Wong (1997) suggested managerial price ramping. Are SEOs poor long-run performers?

Masulis and Korwar (1986) documented significant underperformance of companies issuing new equity, subsequently confirmed by Asquith and Mullins (1986), Mikkleson and Partch (1986) and Schipper and Smith (1986). Loughran and Ritter (1995), extended Healy and Palepu (1990), Ritter (1991) and Loughran, Ritter and Rydqvist's (1994) work in the area of initial public offerings (IPOs), examining the performance of SEO firms. They observed 15.7% and 33.4% five-year holding period returns for IPOs and SEOs when the returns on non-issuing firms matched by capitalisation were 66.4% and 92.8%. Loughran and Ritter (1995) concluded "an investor would have had to invest 44 percent more money in the issuers than in non-issuers of the same size to have the same wealth five years after the offering date". Loughran and Ritter (1997) suggest possible "windows of opportunity", periods during which firms are significantly overvalued providing an opportunity to augment "financial slack". Allen and Soucik (1999) suggest the conclusion of long-run underperformance is dependent on the definition of the 'long-run'.

1. INTRODUCTION

Allen and Soucik (1999) reported a significant relationship between a companies' beta and the extent of post-issue underperformance. This paper investigates this relationship and reassesses factors affecting post-issue performance whilst controlling for risk.

We find that issuers' excess returns are consistent with previous studies – SEOs under-perform significantly following the offering, reverse their performances around the fourth year to actually outperform non-issuers temporarily but this translates into cumulated under-performance over the medium as well as long term.

The remainder of this paper is structured into four sections. We review our research objectives in section 2 and describe the methodology and data sources used in section 3. Our results follow in section 4, whilst section 5 concludes.

2. RESEARCH OBJECTIVES

We control for the effect of risk in SEO performance measures and re-examine whether the issuers in our sample actually do under-perform with respect to a non-issuer benchmark that specifically controls for company betas. We adopt:

Hypothesis 1: *Firms issuing seasoned equity do not under-perform relative to corresponding non-issuers.*

Hypothesis 2a: *SEO firms do not crossover from a period of under-performance to a period of over-performance relative to non-issuers.*

Hypothesis 2b: *SEO firms do not under-perform non-issuers, in aggregate, over the extended long-run.*

When pairing issuers with non-issuing firms we examine firms' age, market capitalisation, year of issue and the annual volume of SEO issues. We regress the performance results on the company beta itself to confirm the effectiveness of our adjustment for this factor.

Hypothesis 3a: *The extent of beta-adjusted SEO underperformance is not a function of age.*

Hypothesis 3b: *The extent of beta-adjusted SEO underperformance is not a function of beta.*

Hypothesis 3c: *The extent of beta-adjusted SEO underperformance is not a function of market capitalisation.*

Hypothesis 3d: *The extent of beta-adjusted SEO underperformance is not a function of the chronological attribute of the issue.*

Hypothesis 3e: *The extent of beta-adjusted SEO underperformance is not a function of volume of seasoned equity offerings in the year of issue.*

We examine the relationship between the opening return and the subsequent risk-adjusted under-performance.

Hypothesis 4a: *SEO firms do not record significant opening returns.*

Hypothesis 4b: *The extent of SEO underperformance is not a function of the size of initial returns.*

3. RESEARCH METHOD

3.1. Data

The raw sample consists of 137 seasoned equity offerings made between January 1984 and October 1993; permitting at least five years of price data for each SEO company in the sample (leading up to 1998). The SEOs must meet the following criteria: (1) the company is listed on the Australian Stock Exchange and recorded in the DataStream Database at the time of the issue, (2) the offer must be a cash offer for common stock, (3) the book value of assets at the end of the fiscal year of issuing must be at least $5 million in 1990 purchasing power and (4) the company undertaking the SEO is not a financial company or a regulated utility. In the five year we remove all issues by the same company made within five years after the SEO to avoid a period overlap bias. This causes a deletion of 35 SEOs from the sample, leaving a total of 102 issues made by 94 companies.

To analyse long run performance we extend the time frame back to October 1986 instead of 1993 to allow for at least 12 years of data. This reduced the sample to 26 SEOs. Some 5 of these companies had multiple issues leaving a sample of 21 firms.

Data was taken from the DataStream Database and crosschecked with the Securities Data Company (SDC) database. The date of incorporation and the date of listing were obtained from the 1998 Australian Stock Exchange Yearbook and the 1998 Australian Stock Exchange Investor Handbook.

3.2. Method

Choice of Performance Benchmarks

At first, a benchmark was established against which the SEO performance would be measured.

1. In the middle of each issue year (defined as 30 June), all common stocks listed on the ASX that have not made an issue in the last five years are ranked according to their market beta.

2. Next, for each issuing firm in the sample a non-issuer is selected from the list that has beta closest to the issuer. If the sample firm has already the largest capitalisation, then a match with next highest market value is selected. This then becomes a beta-and-size matched non-issuer benchmark.

3. If the non-issuer becomes delisted before the end date for the corresponding issuer, a second (and if necessary third, fourth, etc.) matching firm is spliced in after the delisting date of the first matching firm.

3.3. Time series methods

Time Definitions

We define each year as consisting of 12 months, each month comprising 21 trading days.

Initial (or opening) return is calculated over the first trading day on which the seasoned equity was issued. Post-issue returns are computed during the period following the offer date, ie excluding the first day. Three separate time frames are defined:

i. *Short term* – Defined as 3 years following the offer date.

ii. *Medium term* – Defined as 5 years following the offer date.

iii. *Long term* – Defined as 12 years following the offer date. A twelve year period was chosen so as to be long enough for many of SEO’s R&D and Capital Projects to come to fruition thereby permitting testing of Hypotheses 2a and 2b.

Performance Measurement

We use Cumulative Abnormal Returns (CAR) method to measure the performance of firms issuing seasoned equity. Raw daily returns for issuers and non-issuers are first calculated as

$$r_{ISS,t} = \frac{P_{ISS,t}}{P_{ISS,t-1}} - 1 \qquad r_{BM,t} = \frac{P_{BM,t}}{P_{BM,t-1}} - 1$$

where $P_{ISS,t}$ = closing price of the SEO firm on day t

$P_{BM,t}$ = closing price of the benchmark non-issuing firm on day t

The abnormal return is then calculated as the raw return from the issuing firm minus the return on the corresponding non-issuer. Hence

$$ar_{i,t} = r_{ISS,t} - r_{BM,t}$$

Where $r_{ISS,t}$ = Raw return for SEO on day t

$r_{BM,t}$ = Raw return for non-issuer benchmark firm on day t

The average abnormal return for the day t across all SEOs is calculated as the equally weighted arithmetic average of the individual abnormal returns:

$$AR_t = \left(\frac{1}{n}\right)\sum_{i=1}^{n} ar_{i,t}$$

where n = number of SEOs in the sample

The CAR from the first day after the offering until day t is calculated as the sum of the daily average abnormal returns until t. Hence

$$CAR_t = \sum_{d=1}^{t} AR_d$$

To test for the significance of the resulting cumulative abnormal return we use a modified t-statistic that also accounts for the autocovariance that may exist in the time series:

$$t(CAR_t) = \frac{CAR_t \cdot \sqrt{n}}{\sqrt{t \cdot \text{var} + 2 \cdot (t-1) \cdot \text{cov}}}$$

where var = average cross-sectional variance over the measurement period

cov = first-order autocovariance of the AR_t series

We also use holding-period return as an alternative measure of returns:

$$HPR_{i,a:b} = \left[\prod_{t=a}^{b} (1 + R_{i,t}) \right] - 1$$

where $R_{i,t}$ = Raw return of firm *i* on day *t*

a = Beginning of the holding period

b = End of the holding period

The above formula will be used to measure "the total returns from a buy and hold strategy in which a stock is purchased at the first closing market price after listing" (a=1) and held for the subsequent short-term (b=3×252=756), medium term (b=5×252=1260) and long term (b=12×252=3024) period.

3.4. Cross-sectional methods

In the 'cross-sectional analysis' stage of our study we regress the returns of SEOs (dependent variable) on a number of controlling factors (independent variables):

$$CAR_i = \alpha_i + \beta_i \Omega_i + \varepsilon_i \quad \text{(univariate)}$$

$$CAR_i = \alpha_i + \beta_{1,i}\Omega_{1,i} + \beta_{2,i}\Omega_{2,i} + ... + \beta_{n,i}\Omega_{n,i} + \varepsilon_i \quad \text{(multivariate)}$$

where CAR_i = Cumulative abnormal return of SEO *i* for a five year period

Ω_i = Control variable whose effect on SEO performance is being measured

α_i, β_i = Regression coefficients

ε_i = Regression error terms

i. *Age (2 variables)*

INAGE: Number of years from the time of SEO firm's incorporation in Australia.

PUBAGE: Number of years from the time of SEO firm's listing on an organised stock exchange in Australia.

ii. *Company Beta (1 variable)* BETA

iii. *Market Capitalisation (1 variable)* EQUITY calculated market value of the firm expressed in 1990 dollars:

$$EQUITY = \ln(MV_{adj})$$

iv. *Year of Issue (1 variable)* ISSYR: the year in which each issue is made.

v. *Volume of SEOs in the issue year (2 variables)*

$$TOTVOL = \ln(1 + \Psi_{TOT})$$

$$SAMPVOL = \ln(1 + \Psi_{SAMP})$$

The final element is to investigate the impact of initial underpricing on the subsequent performance of the issuer. The initial underpricing will be defined as $R_i = \Re_i - R_{AOI}$, with raw return ($\Re_i$) estimated using four methods:

CORERT: Calculates how deeply was each new share in the offer discounted with respect to the closing price on the day of the issue.

$$CORERT = \left(\frac{P_0}{IP} \right) - 1$$

where P_0 = Closing price on the day of the issue (t=0)

IP = Subscription price for each new share in the SEO

ABSRT: Compares the closing price at the offer date with the closing price on the day just prior to the issue.

$$ABSRT = \left(\frac{P_0}{P_{-1}} \right) - 1$$

DILRT: takes into account the proportion of new equity issued with respect to the equity in place prior to the offer.

$$DILRT = \left(\frac{(\eta + 1) \times P_0}{\eta \times P_o + IP} \right) - 1$$

where η = Ratio at which new equity is issued.

TOTRT: A holding period return for an investor who acquires the necessary number of shares (η) on the last day before the SEO, exercises the right to buy the extra equity, and sells it at the close of the day of the issue.

$$TOTRT = \left(\frac{(\eta + 1) \times P_0}{\eta \times P_{-1} + IP} \right) - 1$$

Each of the market-adjusted definitions of the initial returns will be regressed on the three – year and five – year CARs of the issuers.

4. RESULTS

4.1. UNIQUENESS OF BETA

We examined whether the beta-characteristics of SEO firms are unique relative to non-issuing firms. The betas of our SEO are compared with the 1,106 firms listed on the ASX for which DataStream currently computes company betas. See the beta histogram in Figure I.

FIGURE I

Histogram of Sample versus Population Betas

The distributions of sample and population betas are mapped in a histogram based on 0.1 beta differentiation. The sample consists of 102 firms issuing seasoned equity between the January 1984 and October 1993. Population encompasses all firms listed on the Australian Stock Exchange for which DataStream computed beta over this period. The discrepancy between sample and population betas can be readily observed. Betas of firms issuing seasoned equity tend to be clustered around certain critical values and, unlike population distribution, seem to depart quite substantially from normality. These comparative distributions undergo additional finer scrutiny in Figures II and III, below.

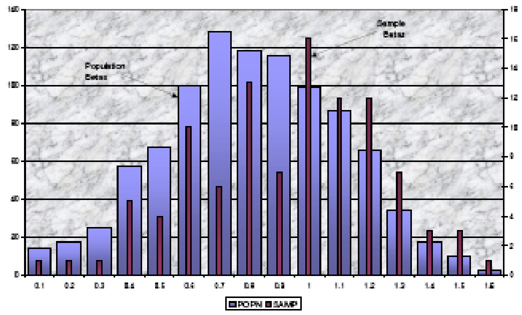
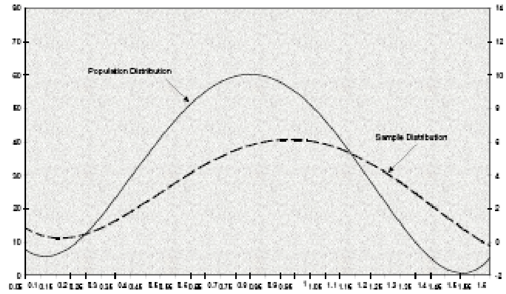


Figure II shows that while the population distribution approximates normality, our sample distribution is skewed to the right and exhibits positive kurtosis. There are differences in risk between issuers and non-issuers.

FIGURE II

Trends in SEO and Population Betas

To clearly identify the disparity between beta distributions of issuers and the population we have constructed trend lines based on the results. These clearly show that the distribution of issuers' betas is – (1) skewed to the right indicating higher average risk; and (2) kurtotic demonstrating the presence of beta concentrations in the extremities, especially to the right of 1.00. It becomes apparent that the beta factor may play a prominent role in affecting the extent of post-issue underperformance of SEOs.



4.2. TIME SERIES PATTERNS using RISK-adjusted benchmark

The cumulative abnormal returns of SEOs observed using the beta-and-size matched benchmark are summarised in Table I Part A, and graphically presented in Figure III Panel A. We also include time-series results from Allen and Soucik (1999) where no explicit adjustment for beta has been made, presented as Panel B in Table I and Figure III. The benchmarks used to form these unadjusted results are based on returns from size-only matched non-issuers and industry-and-size matched non-issuers drawn from the same sample. The underperformance is more profound when beta is controlled for.

Five years following an issue the cumulative CARs for size-matched and industry-and-size matched benchmarks stood at -15.03% (-0.95) and -39.46% (-2.28), respectively, compared to the -124.44% (-5.06) CAR for the beta-adjusted benchmark. The beta-adjusted CAR is dramatic during the first three years, showing -93.61% (-4.91), and then reduces in years four and five.

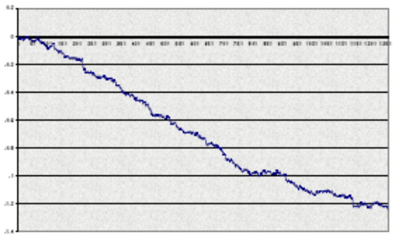
The results reject *Hypothesis 1* – firms that issue seasoned equity do under-perform non-issuers, especially when risk is accounted for. The underperformance is very marked in the first three years, plateaus in years four and five and then downturns again in the eighth year. However, unlike the performance observed with size and industry adjusted benchmarks, years six and seven did not record as significant an over-performance, and the downturn following year eight persisted longer (until year ten) before the turnaround finally emerged. Consequently, this leads to a much more economically significant aggregate cumulative abnormal return of -140.03% (-2.28), although statistical significance at a 5% level is comparable to the other benchmarks. *Hypothesis 2a* cannot be

FIGURE III

Issuers' Cumulative Abnormal Returns in the Short and Medium Term

This Figure graphs the total cumulative abnormal returns of issuing firms as measured against a beta-adjusted benchmark (Panel A) as well as other benchmarks for comparison purposes (Panel B). The time frame is that of a short-to-medium run (ie, 5 years x 12 months x 21 days = 1260 trading days). It can be observed that the underperformance of beta-adjusted cumulative abnormal returns is much more pronounced than one measured against other benchmarks. Given the distribution of betas observed above this is not surprising, since riskier issuers would record higher returns when risk is not adjusted for, which would in turn lead to an underestimation of underperformance seen in Panel B.

PANEL A



PANEL B

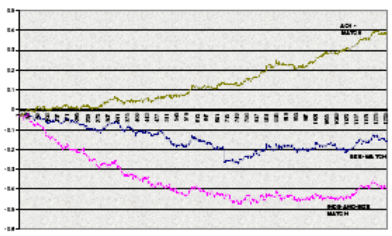


TABLE I

Short and Medium Term Performance of SEOs measured against the i) beta-and-size-matched non-issuers, ii) size matched non-issuers and the iii) industry-and-size matched non-issuers benchmarks over the January 1984 to October 1993 period.

The table reports the excess returns of issuers calculated under the three benchmarks for a period of *five* years since issuing. The data cover 102 seasoned equity offerings from January 1984 to October 1993. The $y(CAR_t)$ column shows the cumulative abnormal return of daily abnormal returns specifically for the one year shown in the "Years Since Seasoning" column. The CAR_t shows the cumulative abnormal return of all daily abnormal returns since the date of seasoned equity issue. Panel A reports the results for CAR measured against the beta-adjusted benchmark, whereas Panel B presents, for comparison purposes, results from the same sample but measured against other benchmark definitions. The respective calculations have been defined by equations:

$$CAR_t = \sum_{t=1}^{t}\left(\left[\frac{1}{k}\right]\sum_{j=1}^{k}\left(r_{i,t(j)} - r_{m,t(j)}\right)\right) \qquad y(CAR_t) = \sum_{t=t-1}^{t}\left(\left[\frac{1}{k}\right]\sum_{j=1}^{k}\left(r_{i,t(j)} - r_{m,t(j)}\right)\right)$$

It should be noted that, for clarity, subscript t in the above equations refers to the year in the "Years Since Seasoning" column. Mathematically, however, each such year comprises of 252 trading days whose returns $(r_{t,day})$ are actually used in the computations. The significance levels (presented in brackets) have been calculated based on the following t-statistic formula (where t refers to the specific time frame covered by CAR_t or $yCAR_t$):

$$t(CAR_t) = \frac{CAR_t \cdot \sqrt{k}}{\sqrt{t \cdot var + 2 \cdot (t-1) \cdot cov}}$$

The added benefit of this t-statistic definition is its ability to account for series autocorrelation when reporting significance level.

	PANEL A		PANEL B			
	Beta and Size matched		Size matched		Ind and Size matched	
Years since seasoning	$y(CAR_t)$ [%]	CAR_t [%]	$y(CAR_t)$ [%]	CAR_t [%]	$y(CAR_t)$ [%]	CAR_t [%]
1	-26.12***	-26.12***	-10.02*	-10.02*	-25.21***	-25.21***
	(-2.38)	(-2.38)	(-1.41)	(-1.41)	(-3.25)	(-3.25)
2	-33.18**	-59.30***	-4.25	-14.27*	-14.01	-39.22***
	(-2.13)	(-3.81)	(-0.42)	(-1.42)	(-1.28)	(-3.58)
3	-34.31**	-93.61***	-11.80	-26.07**	-8.49	-47.71***
	(-1.80)	(-4.91)	(-0.96)	(-2.12)	(-0.63)	(-3.55)
4	-21.77	-115.38***	6.20	-19.88*	3.24	-44.47***
	(-0.99)	(-5.25)	(0.44)	(-1.40)	(0.21)	(-2.87)
5	-9.06	-124.44***	4.85	-15.03	5.01	-39.46**
	(-0.37)	(-5.06)	(0.31)	(-0.95)	(0.29)	(-2.28)

* Significant at 10% level

** Significant at 5% level

*** Significant at 1% level

rejected given SEO firms do not cross over from a period of underperformance to a period of over-performance. We rejection *Hypothesis 2b* – SEO firms do under-perform non-issuers, over the extended long run. Allen and Soucik (1999) suggest that the long-run underperformance of SEOs was dependent on the definition of the 'long-run'. We retest the performance in the extended long run period, using the beta-adjusted benchmark. The results are summarised in Part A of Table II and Figure V, each accompanied by Part B which highlights the findings for other matched benchmarks. *Hypothesis 2a* cannot be rejected as SEO firms do not cross over from a period of under-performance to a period of over-performance.

TABLE II

Long Term Performance of SEOs measured against the i) beta-and-size-matched non-issuers, ii) size matched non-issuers and the iii) industry-and-size matched non-issuers benchmarks over the January 1984 to October 1986 period.

The table reports the excess returns of issuers calculated under the three benchmarks for a period of *twelve* years since issuing. The data cover 21 seasoned equity offerings from January 1984 to October 1986. The $y(CAR_t)$ column shows the cumulative abnormal return of daily abnormal returns specifically for the one year shown in the Years Since Seasoning column. The CAR_t shows the cumulative abnormal return of all daily abnormal returns since the date of seasoned equity issue. The mathematical definitions of these measures and their corresponding t-statistics (presented in brackets) remain identical to those detailed in Table II above. Panel A reports the results for CAR measured against the beta-adjusted benchmark, whereas Panel B presents, for comparison purposes, results from the same sample but measured against other benchmark definitions.

	PANEL A		PANEL B			
	Beta and Size matched		Size matched		Ind and Size matched	
Years since seasoning	$y(CAR_t)$ [%]	CAR_t [%]	$y(CAR_t)$ [%]	CAR_t [%]	$y(CAR_t)$ [%]	CAR_t [%]
1	-20.68	-20.68	-20.96*	-20.96*	-24.05*	-24.05*
	(-1.17)	(-1.17)	(-1.54)	(-1.54)	(-1.46)	(-1.46)
2	-36.43**	-57.11**	3.02	-17.95	-22.43*	-46.48**
	(-2.05)	(-2.28)	(0.22)	(-0.93)	(-1.36)	(-2.00)
3	-19.25	-76.36***	-4.58	-22.52*	-13.62	-60.10**
	(-1.09)	(-2.49)	(-0.34)	(-1.29)	(-0.83)	(-2.11)
4	4.32	-72.05**	-1.03	-23.56*	-4.72	-64.83**
	(0.24)	(-2.03)	(-0.08)	(-1.31)	(-0.29)	(-1.97)
5	8.57	-63.48*	22.84**	-0.72	12.08*	-52.75*
	(0.48)	(-1.60)	(1.68)	(-0.02)	(1.22)	(-1.43)
6	-6.93	-70.41*	16.01*	15.29*	1.16	-51.59*
	(-0.39)	(-1.62)	(1.28)	(1.26)	(0.07)	(-1.28)
7	-12.32	-82.73*	-1.73	13.55*	19.82*	-31.77
	(-0.69)	(-1.76)	(-0.13)	(1.21)	(1.46)	(-0.73)
8	-39.59**	-122.32***	-19.84*	-6.29	-12.98*	-44.75
	(-2.23)	(-2.44)	(-1.46)	(-0.16)	(-1.22)	(-0.96)
9	-17.49	-139.81***	-4.69	-10.98	-0.50	-45.24
	(-0.99)	(-2.63)	(-0.35)	(-0.27)	(-0.03)	(-0.92)
10	-16.57	-156.38***	5.93	-5.05	-1.44	-46.68
	(-0.93)	(-2.79)	(0.44)	(-0.12)	(-0.09)	(-0.90)
11	24.32*	-132.06**	0.29	-4.76	-1.56	-48.24
	(1.37)	(-2.24)	(0.02)	(-0.11)	(-0.10)	(-0.88)
12	-7.97	-140.03**	8.05	3.29	7.65	-40.59
	(-0.45)	(-2.28)	(0.59)	(0.07)	(0.47)	(-0.71)

* Significant at 10% level

** Significant at 5% level

*** Significant at 1% level

We also reject *Hypothesis 2b* –period SEO firms do under-perform non-issuers, in aggregate, over the extended long run.

4.3. Cross-Sectional Analysis using Beta-adjusted benchmark

As a first step in the cross-sectional part of our analysis we regressed the five-year beta-adjusted CARs against the seven control variables previously defined; see results in Table III. None of these variables are statistically insignificant. We then examined the opening gains for investors in the issuing companies, based on the four initial-return definitions; see Table IV, all are highly significant. underpricing has an impact on the extent of post-issue underperformance independent of the risk differential between issuers and non-issuers The results fail to reject *Hypotheses 3a, 3c, 3d* and *3e* – the extent of underperformance does not appear to be related to the issuer's age, market capitalisation, year of issue or the volume of SEOs in the year of issue. We fail to reject *Hypothesis 3b*

TABLE III

Cross Sectional Univariate regressions of CARs on Characteristics Variables

The table shows the results of a univariate regression of cumulative abnormal returns (measured relative to the beta-and-size-matched non-issuers benchmark) on the seven variables suggested to have an impact on the extent of post-issue underperformance, defined by the equation $CAR_i = \alpha_i + \beta_i\Omega_i + \varepsilon_i$ (where α and β are the intercept and coefficient, respectively; Ω is the independent factor and ε represents the error term). The R-Square statistics are also provided. It can be immediately observed that none of the coefficients is significant even at a 10% level. This includes variables TOTVOL and BETA shown in our previous paper to have an impact on the extent of underperformance. As detailed below, TOTVOL is not only highly correlated with BETA, but its effect may have been captured within the opening gain variable DILRT. The loss of BETA significance is especially pleasing as it confirms the validity of our benchmark in removing impact of the beta on post-issue performance. It is important to note that in (unreported) results we have re-examined these findings whilst controlling for the effects of heteroscedasticity, including computations based on ARCH/GARCH models. Similar conclusions have been reached.

Control Variable	Constant	Coefficient	R-Squared
INAGE	-1.296***	0.003	0.000611
	(-2.75)	(0.24)	
PUBAGE	-1.232**	0.092	0.000446
	(-2.20)	(0.01)	
BETA	1.049	-0.16	0.009770
	(-1.24)	(-0.18)	
EQUITY	-1.083	0.021	0.000220
	(-1.37)	(0.15)	
ISSYR	395.2	-0.199	0.038212
	(1.98)	(-1.98)	
TOTVOL	-2.797	0.481	0.003271
	(-0.99)	(0.57)	
SAMPVOL	0.915	-0.887	0.010642
	(0.44)	(-1.03)	

* Significant at 10% level

** Significant at 5% level

*** Significant at 1% level

TABLE IV

Summary of Issuers' Initial Returns based on Four Measurement Definitions

This table reports the average total initial returns following a seasoned equity offering as defined by the four measures of such opening gains (where P_t is the price on day t and η represents the ratio at which new equity was issued):

$$COREERT = \left(\frac{P_0}{IP}\right) - 1 \qquad ABSRT = \left(\frac{P_0}{P_{-1}}\right) - 1 \qquad DILRT = \left(\frac{(\eta+1)\times P_0}{\eta\times P_0 + IP}\right) - 1 \qquad TOTRT = \left(\frac{(\eta+1)\times P_0}{\eta\times P_{-1} + IP}\right) - 1$$

It is readily observable that every measure is significant at minimum 5% level. A conspicuous result is the initial return measured by COREERT variable standing at 163.4%. This is not surprising, however, as it is the most crude indicator of opening gains computing such figure simply as a ratio of post-issue share-value to the sale-price of new equity whilst ignoring all other aspects including the proportion in which new equity was offered.

Measurement Method	Initial Return	t-statistic
COREERT	163.4%	6.43***
ABSRT	10.9%	2.68***
DILRT	4.9%	1.66**
TOTRT	21.6%	3.66***

* Significant at 10% level

** Significant at 5% level

*** Significant at 1% level

(that the relative performance is unrelated to beta) *Hypothesis 4a* is also rejected by the results, highlighting the significant opening returns recorded by issuing firms. Finally, we reject *Hypothesis 4b*; the extent of underperformance is related to the opening return.

5. CONCLUSION

Our results are consistent with previous studies. Issuers initially under-perform, but then turn around and actually outperform non-issuers on an annual basis. This might be attributed to the maturation of capital and R&D projects that issuers have taken up at a more rapid than non-issuers following an SEO (Loughran and Ritter, 1997). As competitors catch up the advantage is eroded, and SEOs have an aggregate loss in the medium (5 year) as well as long (12 years) term.

TABLE VI

Results from Cross-Sectional Multivariate Regression Analysis of the Four Major Factors on post-Issue Excess Returns measured against the Beta-Adjusted Benchmark.

This table presents the results obtained by regressing the cumulative abnormal returns (measured against the beta-adjusted benchmark) on the four variables identified in our previous research (using alternative benchmarks) as having the greatest impact on post-issue performance. This regression was defined by the equation $CAR_i = \alpha_i + \beta_1\Omega_{1i} + \beta_2\Omega_{2i} + ... + \beta_n\Omega_{ni} + \varepsilon_i$ (where α and β_n's are the intercept and factor coefficients, respectively; Ω_n's are the independent control variables and ε represents the error term). It can be readily noted that only the DILRT variable, which is a measure of an initial return, exhibits significance. The loss of significance in BETA gives credence to our choice of benchmark in its ability to control for the beta differentials between issuers and non-issuers. Lack of significance of TOTVOL and INAGE perhaps indicates that the characteristics proxied by these variables had been successfully captured by DILRT variable and by the risk adjustment process (viz. Section 4.3). This multivariate regression was also re-examined controlling for the effects of heteroscedasticity, including computations based on ARCH/GARCH models. The (unreported) results draw identical conclusions.

Control Variable	Coefficient	t-statistic
DILRT	-1.912**	-1.69
TOTVOL	0.435	0.49
BETA	-0.016	-0.02
INAGE	-0.002	-0.12

* Significant at 10% level

** Significant at 5% level

*** Significant at 1% level

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