How are Proceeds from Seasoned Equity Offerings Used?

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Abstract

We find that both investment and compensation policies become less efficient following seasoned equity offerings. During the year of SEO and the following year, the shareholder return-to-investment sensitivity decreases, the likelihood of overinvestment increases, and acquisition announcement returns decrease. At the same time, top officers' and directors' compensation increases, their pay-for-performance sensitivity decreases, and firm value decreases. These post-SEO changes are significantly related to investor reactions at the time of SEO announcements. Our results are based on publicly-listed Chinese firms over the period 2000 to 2012, which experienced exogenous regulatory shocks on the eligibility to issue SEOs. The shocks allow construction of instruments to address endogeneity issues. Our findings imply that SEO proceeds, on average, are used unproductively for shareholders and provide private benefits to management.

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I. INTRODUCTION

Seasoned equity offerings are an important source of external financing, and yet surprisingly little direct evidence exists on how productively the proceeds are used. DeAngelo, DeAngelo, and Stulz (2010) provide evidence that a near-term cash need is a primary motive for SEOs. Kim and Weisbach (2008) show firms substantially increase capital expenditures, research and development expenses, acquisitions, and inventory following an SEO. How productive are these uses of SEO proceeds?

Jung, Kim, and Stulz (1996) argue that agency problems may lead to unproductive use of SEO proceeds and that investors' concern with the potential misuse is an important reason for the well-documented negative stock market reaction to the announcement of SEOs. As supporting evidence, they document less negative market reaction to SEO announcements when the issuing firm has higher growth opportunities – they conjecture high growth firms are less likely to waste newly raised funds. Kim and Purnanandam (2014) go a step farther: They argue that the investor concern with misuse of SEO proceeds is limited to firms with weak corporate governance, providing evidence that most of the previously documented negative investor reactions to the announcement of primary SEOs are attributable to weak governance.[1]

Although this link between SEO announcement returns and agency problems is informative, there is little direct evidence on how firms' real activities are jointly affected

[1] Primary offerings are distinct from secondary offerings. Proceeds of shares sold through primary offerings go to the firm, making them susceptible to misuse by the management. Secondary offerings, by contrast, are sales of shares owned by corporate insiders and block-holders, so the proceeds do not go to the firm. Kim and Purnanandam (2014) show that investors react negatively to the announcement of secondary offerings because of the negative signal transmitted by better informed investors (Leland and Pyle, 1977). They also show that the market does not react negatively to the announcement of primary offerings unless the issuer has weak governance. Their evidence is based on difference-in-differences in the market reaction to an external shock weakening corporate governance.

by SEOs and agency problems, leaving several unanswered questions: Are SEO proceeds indeed used less productively? If so, does the misuse destroy shareholder value? Do firms become more generous in compensating directors and managers with the new infusion of cash flows from an SEO?

We investigate these issues by examining how SEOs affect the efficiency of corporate investments and managerial compensation. We also relate SEO announcement returns to post-SEO changes in investment efficiency and managerial compensation. We focus on investments and managerial compensation because they are discretionary and susceptible to self-serving behavior.

Our investigation is based on Chinese SEOs. The motivation is two-fold. First, endogeneity issues in the choice of SEOs present a challenge to identify the impacts of SEOs on corporate behaviors and performance. The decision to issue an SEO may be affected by unaccounted time-varying factors that also affect corporate activities and performance. Such factors cannot be controlled for with firm fixed effects. China's Securities Regulatory Commission (CSRC) enacted two regulations that became effective in 2006 and 2008, each imposing greater restrictions and higher standards on the eligibility to issue SEOs. These regulatory changes provide exogenous shocks that can be used to construct instruments to study causal effects.

Second, SEOs in China have grown over time, making them one of the main sources of external financing. Chinese firms rely more heavily on SEOs relative to US firms. Over the period 2010 through 2012, for example, the ratio of capital raised through SEOs by non-financial Chinese firms to their market capitalization was about 0.73%; the same ratio for US counterparts was about 0.20%. (Source: http://data.worldbank.org.)

We find that both investment efficiency and director and officer (D&O) compensation efficiency decrease significantly during the year of an SEO and the year after – hereafter, SEO years. Firm value also decreases. Because SEOs bring a large amount of free cash to the firm, these findings are consistent with Jensen's (1986) free cash flow argument that the availability of free cash flows entices management to deviate from the goal of shareholder value maximization and invest in negative NPV projects and/or pursue more private benefits.

Corporate investment efficiency is measured in three different ways: the sensitivity of stock returns to capital expenditures, the likelihood of over-investment, and acquisition announcement returns. We find that investments undertaken during SEO years tend to destroy, rather than create, value for shareholders.

How do free cash flows generated by SEOs affect those in control, directors and top officers? D&O compensation increases significantly during SEO years without improving firm performance. Their pay-for-performance sensitivity decreases significantly during SEO years. D&Os seem to engage in more self-serving behavior during SEO years.

Unsurprisingly, these drops in investment efficiency and compensation efficiency hurt shareholders. Stock returns during SEO years are lower. The lower stock returns due to lower investment efficiency and compensation efficiency are anticipated by investors at the time of SEO announcements. The three-day SEO announcement return, which averages -0.73% in our sample, varies significantly with the firm's post-SEO changes in investment and compensation efficiency. The announcement return is positively related to post-SEO improvements in investment and compensation efficiency. Investors seem to anticipate how productively SEO proceeds will be used and react accordingly.

We also separately examine underwritten offerings and rights offerings. Previous studies show that rights offerings are associated with less information asymmetry (Heinkel and Schwartz, 1986; Eckbo and Masulis, 1992) and less adverse selection (Krasker, 1986). Rights offerings are designed to raise capital from current shareholders, including directors and top officers, whereas underwritten offerings are open to all investors, generating much of the proceeds from outside investors. Hence, underwritten offerings will lead to more diffusion in ownership concentration, and we expect more self-serving behavior by directors and top officers with funds raised through underwritten offerings.

In China, requirements for rights and underwritten offerings were similar prior to 2006. The 2006 regulation requires that rights offerings be conducted only through best efforts, and if the subscription rate falls below 70%, the offering fails and any funds raised must be returned to investors. The regulation also requires that controlling shareholders disclose their intended subscription prior to the shareholder meeting and must not renege on it; otherwise, the offering fails. These requirements are likely to increase participation by current shareholders in successful rights offerings, which helps maintain ownership concentration and reduce agency problems. Our sample shows that the average ratio of funds raised from original shareholders to all funds raised over the period 2000-2012 is 93.4% for rights offerings and 38.9% for underwritten offerings.

We find both rights offerings and underwritten offerings are followed by reductions in investment efficiency, compensation efficiency, and firm value. However, the negative effects appear stronger for underwritten offerings than rights offerings, and the decrease in pay-for-performance sensitivity is observed only in the underwritten offering sample. Moreover, the average SEO announcement return of -0.73% is driven

entirely by underwritten offerings. The average announcement return is -2.25% for underwritten offerings and zero for rights offerings.

This paper contributes to the literature in several ways. Much of the SEO literature focuses on information asymmetry, adverse selection, and market timing to explain negative investor reaction to SEO announcements (e.g., Leland and Pyle, 1977; Myers and Majluf, 1984; Choe, Masulis and Nanda, 1993). However, Jensen's (1986) free cash flow argument suggests that SEO proceeds are susceptible to unproductive use due to agency problems, leading to a number of studies yielding insights into the use of SEO proceeds (e.g., Walker and Yost, 2008; Autore, Bray, and Peterson, 2009; DeAngelo et al., 2010; McLean, 2011). We add to this literature by providing direct evidence that SEOs are followed by significant reduction in investment efficiency. We also show that post-SEO changes in investment efficiency are significantly related to SEO announcement returns.

We also identify that, in so far as shareholders are concerned, managerial compensation can be an important channel to waste proceeds from SEOs. Unlike corporate investment, managerial compensation has received little attention in the SEO literature. We find a significant reduction in managerial compensation efficiency during SEO years. Moreover, we identify a positive relation between post-SEO changes in managerial compensation efficiency and investor reaction to the announcement of underwritten SEO offerings.

Panel regression estimation with SEO variables as independent variables is challenging, because the decision to issue equity is associated with a number of other firm level factors such as internal funds, debt issuance, the market-to-book ratio, stock returns, and firm age and size (Alti and Sulaeman, 2012; Baker and Wurgler, 2002; Jung

et al., 1996; DeAngelo et al., 2010; Hovakimian, Opler, and Titman, 2001), as well as unaccounted time varying factors that cannot be controlled for with firm fixed effects. Studying the Chinese SEO experience allows us to use external regulatory shocks on SEOs to construct instruments to study causal effects.

Finally, Chinese firms' reliance on SEOs as a source of external financing has been rising sharply in recent years. How SEOs affect corporate investment and compensation efficiency in the second largest economy in the world with a rapid growth of financial markets should be of interest on its own right. More generally, our findings raise important issues about external financing in emerging markets, highlighting the need for monitoring mechanisms that can help ensure productive use of externally raised equity capital.

The next section provides general background and SEO regulations in China. Section III describes data and empirical strategy. Section IV estimates changes in investment efficiency, compensation efficiency, and firm performance following SEOs. Section V calculates SEO announcement returns and relates them to post-SEO changes in the efficiency of investment and compensation. Section VI concludes.

II. SEASONED EQUITY OFFERINGS IN CHINA

II.1 General Background

The Chinese financial market has several favorable features for studying SEOs. China has a large SEO market relative to the size of its securities markets. Since China opened the Shanghai Stock Exchange (SHSE) and the Shenzhen Stock Exchange (SZSE) in 1990 and 1991, equity markets have become an important source of external financing,

playing a much more important role than bond markets.[2] Corporate bond markets have been developing at a much slower pace than stock markets.[3]

The type of SEOs available and the underwriting practices in China follow the international standard. There are three types: (1) rights offerings, in which current shareholders are given rights to purchase new shares at a discount such that a current shareholder is given the opportunity to maintain a proportionate share in the company before the shares are offered to the public; (2) underwritten offerings, in which new shares can be purchased by any investors; and (3) private placement, in which new shares can be purchased by no more than ten qualified and specific investors. Our analyses exclude private offerings and focus only on rights and underwritten offerings, because the external regulatory shocks used to construct instruments apply only to public offerings.

Chinese regulators require that firms hire an underwriter to issue new shares for rights and underwritten offerings. As in the US, two types of underwriting contracts, best efforts and firm commitment, are practiced in China. These similarities allow generalization of findings based on Chinese SEOs. However, some might consider Chinese corporate governance system weaker than the global standard. If so, to the extent that agency problems affect the productivity of SEO proceeds, the agency-related effects might be more noticeable and hence easier to identify with Chinese data.

In the US, underwritten offerings often include secondary offerings, sale of shares held by insiders and block holders. Secondary offerings are virtually non-existent in China. This is an important distinction from US underwritten offerings. Proceeds of

[2] Over the period 2010 through 2012, Chinese listed firms raised 429.5 billion RMB through bond markets, while they raised 2,147.5 billion RMB through equity markets.
[3] A regulated bond market for enterprises began in 1996; however, the strict approval process required for issuing bonds has led to a situation where only very large and stable companies can issue bonds.

secondary offerings do not go to the firm; hence, they cannot be misused by the management. Instead, secondary offerings transmit negative signals from better informed insiders and block holders, causing negative investor reaction (Leland and Pyle, 1977). Because Chinese SEOs are virtually all pure primary offerings and do not contain secondary offerings,[4] they are devoid of this type of negative signal.

II.2 Regulatory Changes on Chinese SEOs

A particularly attractive aspect of studying Chinese SEOs is the unique regulatory regimes on SEOs, which contain exogenous shocks to the eligibility for SEOs. We use the shocks to construct instruments to address endogeneity issues. Prior to 2006, a listed firm could issue equities as long as it issued a dividend in the past three years. On May 6, 2006, China's Securities Regulatory Commission (CSRC, equivalent to the US SEC) issued Decree No.30, Measures for the Administration of the Issuance of Securities by Listed Companies. The 2006 regulation requires that if a firm wants to conduct a public SEO, the cumulative distributed profits of the firm in cash or stocks in the immediate past three years shall not be less than 20% of the average annual distributable profits realized over the same period. In addition, firms must have positive net income over the past three years to qualify for rights offerings. For underwritten offerings, firms must show a weighted average ROE over the past three years no less than 6%.

CSRC strengthened the requirement further on October 9, 2008, when it issued Decree 57, Notice on Amendment in Regulations for Listed Companies' Cash Dividend.

[4] There were three mixed offerings containing secondary offerings of state-owned shares during June 2001 and October 2001 when China Securities Regulatory Commission (CSRC) required that if a firm plans to issue N new shares through an underwritten offering and the firm has state-owned shares (which were non-tradable at the time), then the offering must contain 10% of N state-owned shares. This means the firm will issue 1.1N shares in total, with 0.1N shares being state-owned shares. Such secondary offerings of state-owned shares are unlikely to transmit the type of negative signals associated with secondary offerings in the US. The regulation was effective for only four months, and only three SEO cases were completed during that time.

The 2008 regulation increases the dividend requirement; the cumulative distributed profit in cash in the past three years shall not be less than 30% of the average annual distributable profits realized in the same period. The 2008 regulation not only raises the required dividend level, but also counts only cash dividends toward the 30% requirement.

III. DATA

III.1 Sample Description

Our sample is constructed with all A-share firms[5] listed on the Shanghai Stock Exchange and Shenzhen Stock Exchange. The sample includes listed firms from all three boards (i.e., the main board, the small and medium enterprise board, and the growth enterprises board).[6] Our data are taken from several sources. Financial accounting data, corporate governance data, and director and executive compensation data are taken from Resset.[7] SEO data are taken from CSMAR.[8] The dividend ratio required by the 2006 and 2008 regulations (the cumulative distributed profits in the past three years over the average annual distributable profits realized over the same period) are taken from Wind Information.[9] Financial firms as defined by the CSRC (e.g., banks, insurance firms, and brokerage firms) are excluded. We also exclude ST (special treatment) and *ST

[5] In mainland China there are two types of stocks: A-share and B-share. Originally, the A-share market was designed for domestic investors to trade with RMB, and the B-share market was designed for foreign investors to trade with US dollars. The B-share market was opened to domestic investors in 2001, and qualified foreign institutional investors (QFII) were also allowed to trade in the A-share market beginning in 2006. A firm can issue both A-shares and B-shares, and these shares have identical rights. We restrict our sample to the A-share market because there are currently 106 firms listed in the B-share market, and 84 of them are also listed in the A-share market. The total market capitalization of the A-share market is about 122 times that of the B-share market as of the end of 2013.

[6] The Shenzhen Stock Exchange has three boards: the main board, established in 1991; the small and medium enterprise board, established in 2004; and the growth enterprises board, established in 2009. The Shanghai Stock Exchange has only the main board.

[7] Resset is a financial data provider in China, equivalent to Compustat in the US. Website: http://www.resset.cn/en/

[8] CSMAR is another financial data provider in China. Its database for seasoned equity offering is more detailed than to Resset's. Website: http://www.gtadata.com/

[9] Website: http://www.wind.com.cn/En/Default.aspx

companies. Firms are classified as such if they have two (ST) and three (*ST) consecutive years of negative net profit. Because these companies are not allowed to issue SEOs, they are unaffected by the 2006 and 2008 regulations.

These selection criteria lead to 18,459 firm-year observations associated with 2,290 unique firms over the period 2000-2012. The sample starts in 2000 because underwritten offerings were first allowed in 2000. Board information also is available only after 2000. For compensation analyses, the sample period starts in 2001 because compensation data are not available until 2001. All accounting variables are winsorized at the 1% level. All monetary variables are normalized to 2000.

Table I lists the sample distribution by year. Column (1) reports the number of firms in the full sample for each year. Columns (2)-(7) show the number of SEOs in each year. The table shows the number of public SEOs by two dates, the announcement date and the offering date. The announcement date is when the decision to issue an SEO is announced; the offering date is when the firm receives the newly-raised capital. The SEO cases are listed separately for underwritten and rights offerings. Because our analyses are about how the proceeds are used, we use the offering date to define SEO years—the year of SEO and the following year. We focus on these two years because the impact of the newly-raised capital on the firm's investments and compensation, if any, should be most noticeable during those years.

In total, 481 SEOs are announced, and 557 SEOs are made during 2000 to 2012. The difference between the number of announcements and offerings is due to seventy-six SEOs announced in 1999. About two-thirds are rights offers and one-third is underwritten offers. The table shows a steady decline in the number of SEOs until 2007, when a big jump in the number of announcements occurred. The very small number of

announcements in 2005 is due to the Split Share Structure Reform initiated in April, 2005, when the CSRC stopped approving any IPO or SEO proposals until May, 2006.[10] The sharp increase in the announcement of SEOs in 2007 reflects the release of suppressed SEOs during 2005 and 2006. Chinese stock market also reached its peak in 2007.[11]

III.2.Definition of Key Variables

III. 2.1. The SEO Variable

The key variable is an SEO indicator, *SEO,* equal to one in SEO years, the year of SEO and the year after. The coefficient on *SEO* reflects the two-year average effect of an SEO, reducing noise arising from uneven timing of SEOs within a year (some SEOs are issued early in the year, while others are issued later in the year.) As a robustness check, we follow Kim and Weisbach (2008) and define *SEO* equal to one only in the year after an SEO year. The results, reported in Appendix III, Panel B, are robust.

III. 2.2 Instrumental Variables

The major challenge in estimating impacts of SEOs on corporate behavior with panel data is that the decision to issue an SEO is endogenous. We address the endogeneity issue by using the 2006 and 2008 SEO regulations to construct instruments. The past dividend payout ratio requirements in those regulations alter the eligibility to conduct SEOs for some firms (firms that did not pay sufficient dividends), while leaving others (those that paid sufficient dividends) unaffected.

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[10] Prior to the Split Share Structure Reform, approximately two-thirds of domestically listed A-shares were not tradable (Li, Wang, Cheung and Jiang, 2011), yet these non-tradable shares enjoyed the same rights as tradable shares. Split Share Structure Reform was designed to convert these non-tradable shares into tradable shares. The reform was initiated in April, 2005, and CSRC stopped approving SEO and IPO proposals until the reform was completed. To account for the impact of Split Share Structure Reform, we include the percentage of non-tradable shares as a control variable in all regressions.

[11] Shanghai Stock Exchange Composite Index reached its peak of 6124.04 on October 16, 2007 and has declined since then. The index was 2115.98 on December 31, 2013.

The validity of instruments requires two conditions. The relevancy condition requires that the instrument must be correlated to the endogenous variable (SEO). This condition will not be satisfied if low dividend-paying firms can circumvent the regulations without costs. The 2006 regulation counts stock dividends towards meeting the dividend requirement. If low dividend-paying firms could anticipate the forthcoming regulation, they may have satisfied the dividend requirement by issuing sufficient stock dividends during 2003 - 2005. However, data show that of 600 dividend cases in 2005, only 41 include stock dividends. Of all the dividend cases over the period 2003-2005, 94% did not issue any stock dividends. The 2008 regulation excludes stock dividends in defining the dividend requirement. Thus as a robustness check, we include the 2008 regulation in constructing IVs. The results, reported in Appendix III, Panel C, are robust.

It is possible for some firms to anticipate the regulatory changes, increase cash dividends prior to the regulation, and gross up the size of SEO to make up the cash needed for dividends prior to the SEO. However, such maneuvers impose several types of costs. For one, firms wishing to issue SEOs are typically short of capital. Paying out cash dividends may lead to a reduction in value-enhancing investments. Borrowing money to pay dividends may lead to a higher than optimal level of financial leverage. Furthermore, anticipation is subject to uncertainty, making the payoffs from dividend maneuvers subject to uncertainty and reducing the present value of the benefits. In addition, SEOs in China and the amount that can be raised require the CSRC's approval, which adds further uncertainty over whether and how much capital can be raised through an SEO. Given these reasons, it seems safe to assume that the relevancy condition is satisfied.

The second condition is the exclusion restriction; the instrument should not be correlated with the error term of the second-stage regression. In other words, the

instrument should not be correlated with the dependent variable after controlling for relevant variables. Higher dividends may reduce free cash flows, discouraging firms from misusing their capital (Jensen, 1986). However, the regulation is about past dividends, not current or future dividends. If a firm temporarily increased dividend prior to the regulation to circumvent it, the maneuver is unlikely to reduce free cash flows after the SEO, because such a firm will gross up the size of SEO by the amount of dividend increases prior to the regulation. Thus, the regulation is unlikely to directly affect corporate investments or managerial compensation. However, the instrument may be indirectly related to corporate behavior through its relation with the strength of corporate governance. For example, better governed firms are less likely to misuse SEO proceeds. One might argue that firms with better corporate governance pay more dividends and hence are less likely to be affected by the regulation. Thus, we control for a number of proxies for the strength of corporate governance in all regressions. In addition, we re-estimate all regressions with the dividend payout ratio as an additional control variable. The results shown in Appendix III, Panel E are robust.

To construct instrumental variables based on 2006 and 2008 regulations, we first define a dummy variable *AFFECTED_06,* which equals one if a firm has distributed less than 20% of the distributable profits realized over the past three years as of year 2005, and zero otherwise. We use 2005 as the base year to decide whether a firm is affected by the 2006 regulation because SEOs issued in 2006 may have been approved in 2005 or earlier. Our sample shows that, on average, an SEO process takes about 242 days to complete, from the initial announcement to the receipt of the proceeds.

The 2006 regulation based instrument, *IV_06 = AFFECTED_06* x *POST_REG. POST_REG*, the post regulation indicator, equals one when the year of observation is

2008 or later to ensure that *IV_06* equals to one only when the SEO is affected by the regulation. Because our SEO years include the year of SEO and the year after, an *SEO* equal to one in year 2007 could be an SEO issued in 2006 but approved in 2005. The instrument based on the 2008 regulation, *IV_08*, is constructed the same way; *AFFECTED_08* equals one if a firm distributed less than 30% of distributable profits realized over the past three years, and *POST_REG* is equal to one if the year of observation is 2010 or later.

In addition to these regulation based IVs, we include another instrument, two-year lagged market-to-book ratio (MTB). This instrument is based on well-documented evidence that market timing has a statistically significant influence on the decision to conduct an SEO (Loughran and Ritter, 1995, 1997; Baker and Wurgler, 2002; DeAngelo et al., 2010). It is lagged by two years because it takes about two-thirds of a year from an SEO announcement to the issuance and *SEO* is defined over the year of SEO issuance and the following year. The two-year lagged *MTB* might not be a valid IV if it is correlated to the current *MTB* and the current *MTB* is related to our dependent variables of interest. However, data show that current MTB is uncorrelated with two-year-lagged MTB (see Appendix II, Panel F).

III.3. Summary Statistics

Table II provides summary statistics for all key variables. Panel A shows the statistics for the full sample. The mean of *AFFECT_06* and *AFFECT_08* are 0.33 and 0.43, indicating 33% of sample firms in year 2005 are affected by the 2006 regulation, while 43% of the firms in year 2007 are affected by the 2008 regulation.

Panel B compares the mean of each variable for the SEO and non-SEO sample. The SEO sample shows lower stock returns and Tobin's Q, but higher levels of over-

investment. In addition, SEO firms tend to have higher dividend payout ratios, leverage, tangible assets ratios, ROA, non-tradable shares, and lower shareholdings by directors and top officers. SEO firms also tend to be younger and to have a lower percentage of independent directors on their boards.

Panel C compares the pre- and post-SEO samples. It shows stock returns, Tobin's Q, and ROA drop significantly after an SEO, but capital expenditures increase during SEO years.

IV. EFFICIENCY CHANGES FOLLOWING SEOS

IV.1. Investment Efficiency

We begin by estimating changes in the efficiency of corporate investment during SEO years using three measures. The first measure is the stock return-to-investment sensitivity, a proxy for the contribution capital expenditures make to shareholder value creation. The second is the likelihood of over-investment using the expected investment model in Richardson (2006). The third is three-day abnormal returns surrounding acquisition announcements.

IV.1.1. Stock Return-to-Investment Sensitivity

We proxy changes in shareholder value by yearly stock returns and relate it to capital expenditures during SEO years as follows:

$$YRRET_{i,t} = \beta_0 + \beta_1 SEO_{i,t-1} + \beta_2 \ln(CAPEX_{i,t-1}) + \beta_3 SEO_{i,t-1} * \ln(CAPEX_{i,t-1}) + \beta_4 X_{i,t} + a_t + a_i + \varepsilon_{i,t} \quad (1)$$

YRRET is the buy and hold return of firm i's stock in year t, *ln(CAPEX)* is the logged value of capital expenditures (defined as cash paid to acquire fixed assets, intangible assets, and other long-term assets), and *SEO* is the indicator for SEO years (the year of SEO and the year after). The variable of main interest is the interaction of *SEO* and

ln(CAPEX). Its coefficient, β_3, estimates the differential impact capital expenditures have on shareholder value during SEO years from that during non-SEO years. The two key independent variables are lagged by a year to avoid reverse causality – e.g., an SEO stemming from market timing.

The regression controls for firm fixed effects, a_i, and year fixed effects, a_t. X is a vector of control variables. They include firm age, as measured by the logged value of the number of years the firm has been listed, *ln(FIRM_AGE)*; non-linear firm size effects with sales (*SALES*) and its square term ($SALES^2$);[12] return on equity, *ROE*; *Leverage*, as measured by the sum of short- and long-term debt over total assets; *PPE/TA*, property, plants, and equipment over total assets; *SALES_GR*, sales growth rate to control for growth opportunities. We also control for governance characteristics and factors unique to Chinese financial markets (e.g., Li et al., 2011): *%_IND_DIR*, the percentage of independent directors on the board; *%_EXE_OWN*, percentage of shares held by directors and top officers (D&Os); *%_STATE_OWN*, the percentage of shares held by the government; and *NONTRDPCT*, the percentage of non-tradable shares, to control for potential impacts of the Split Share Structure Reform in China. All control variables are concurrent to *YRRET*. Robust standard errors are clustered at the firm level.

Table III reports the second-stage estimation result of the IV regression in column (1). The first-stage results are reported in Appendix II, Panel A. The second-stage result shows capital expenditures during non-SEO years are followed by significant increases in shareholder return. However, the coefficient of the interaction term is significantly negative with an absolute magnitude more than ten times that of ln(CAPEX). These coefficients imply that although capital expenditures during non-SEO years are

[12] We do not use total assets to measure firm size because total assets mechanically increase after SEOs.

shareholder value enhancing, capital expenditures made during SEO years are value-destroying.

The coefficients on the control variables are intuitively appealing. Shareholder returns are positively related to ROE and sales growth rate, and are negatively related to firm size in a non-linear fashion, the fraction of tangible assets, leverage, the percentage of government ownership, and the fraction of non-tradable shares.

We also report the OLS estimation result in columns (2) for the sake of full disclosure. However, the result is unreliable because of possible omitted variables associated with $SEO_{i,t-1}$ and $SEO_{i,t-1}$*ln($CAPEX_{i,t-1}$).

IV.1.2. Likelihood of Over-Investment

One may also infer changes in investment efficiency by testing a more direct implication of Jensen's (1986) free cash flow hypothesis: The infusion of free cash flows from SEOs leads to more overinvestment. To measure overinvestments, we estimate the following model.

$$Inv_{i,t} = \gamma_0 + \gamma_1 \text{Tobin's } Q_{i,t-1} + \gamma_2 Leverage_{i,t-1} + \gamma_3 Cash_{i,t-1} + \gamma_4 Firm\_Age_{i,t-1} + \gamma_5 Ln(TA)_{i,t-1} + \gamma_6 YRRET_{i,t-1} + \gamma_7 Inv_{i,t-1} + a_t + a_j + \varepsilon_{i,t} \quad (2)$$

$Inv_{i,t}$ is net investments firm i makes in year t, defined as the ratio of (CAPEX – cash received from disposals of fixed assets, intangible assets, and other assets) to total assets at the beginning of the year. Following Richardson (2006), we use the previous year's *Tobin's Q*, *Leverage* (the sum of short- and long-term debt over total assets), *Cash* (cash and cash equivalent over total assets), *Firm_Age*, (firm age), *Ln(TA)* (the logged value of total assets), *YRRET* (stock return), *Inv*; and year- and industry fixed effects as factors to predict the normal investment level for a firm in a given year. We use the CSRC's industry classification, which contains 12 industry sectors.

Residuals of regression (2) are used to construct the overinvestment indicator variable, *INV_OVER*, which is equal to one if the residual is greater than 0.08 (one-half of the sample standard deviation), and zero otherwise. We then estimate the likelihood of over-investment with the following firm level conditional logistic regression:

$$INV\_OVER_{i,t} = \Phi\ (\beta_0 + \beta_1 SEO_{i,t} + \beta_2 X_{i,t} + \Sigma Year_t + \varepsilon_{i,t}) \qquad (3)$$

β_1 is the coefficient of main interest. X is the same time-varying control variables as in regression (1). A firm level conditional logistic regression is equivalent to a logistic regression with firm fixed effects. Year dummies are included to control for year fixed effects. Robust standard errors are clustered at the firm level.

Table IV represents the conditional logit estimation results. Both the second-stage result of IV regression and the OLS estimation result show positive and significant coefficients on *SEO*. Firms seem more likely to over-invest during SEO years. The marginal effect of *SEO* is 0.33, which implies that the probability to overinvest increases by 33% when *SEO* equals to one

IV.1.3 Acquisition Announcement Returns

Our third test focuses on the acquisition announcement returns of acquiring firms. Because acquisitions represent large, highly visible corporate investments, market reactions to acquisition announcements are often used to measure the efficiency of investment and the quality of governance (e.g., Masulis, Wang, and Xie, 2007**)**. Acquisition announcement returns are measured by abnormal returns over a three-event day window (-1, 1) surrounding the announcement date. Abnormal returns are estimated using the market model with the A-share value-weighted index over -270 to -2 event days. Following Moeller, Schlingemann, and Stulz (2004), we consider only completed acquisitions and exclude acquisitions with a transaction value below 1 million RMB (the

5th percentile in the acquisition sample). When a firm has more than one acquisition announcement in a year, we use the deal with the largest transaction value. We estimate the following specification:

$$ACQ\_CAR_{i,t} = \beta_0 + \beta_1 SEO_{i,t-1} + \beta_2 X_{i,t-1} + a_t + a_j + \varepsilon_{i,t} \qquad (4)$$

ACQ_CAR is the acquirer's three-day cumulative abnormal returns surrounding the announcement date. X is the same time-varying control variables as before. All control variables are lagged by one year. Year and industry fixed effects are also included. Standard errors are clustered at the industry level as defined by the CSRC.

Table V reports the estimation results. The second-stage IV regression estimate shows a negative coefficient on *SEO*, significant at the 10% level. The point estimate suggests acquisition announcement returns are, on average, 2.7% lower during SEO years. It appears acquisitions following SEOs are less value enhancing.

The negative coefficient on ROE and the positive coefficient on *%_IND_DIR* indicate, respectively, that investors are more concerned when less profitable firms make acquisition announcements and that board independence helps guide the firm to pursue higher-valued acquisitions. To check the robustness, we re-estimate with an alternative event window (-2, +2) to measure acquisition announcement returns. The results, shown in the Appendix III, Panel D, are robust.

In sum, regardless of how we measure the efficiency, corporate investments seem to become less efficient after firms receive SEO proceeds.

IV.2. Director and Officer Compensation Following SEOs

Applying Jensen's (1986) free cash flow hypothesis to the case of compensation would predict that the new infusion of funds from SEOs may lead directors and officers (D&Os) to become more generous in compensating themselves. To investigate this issue,

we estimate changes in D&O compensation levels and their pay-for-performance sensitivity during SEO years.

IV.2.1. D&O Compensation Level

Chinese regulators have been pushing public firms to provide more detailed disclosure of managerial compensation. Starting from 2001, the CSRC requires publicly listed firms to disclose salaries and bonuses of directors and senior managers. In contrast to the US, where stock grants and options are an important component of managerial compensation, most compensation in China takes the form of cash payment. For example, our database (Wind database) shows that only 1.6% (31 firms) of exchange-listed companies in 2010 granted stock or stock options. Thus, our analysis focuses on cash compensation. The total D&O compensation level in a year, *TOTYRPAY*, is the sum of cash salaries and bonuses to of all directors and senior managers. This variable is obtained from Resset database. We estimate the following:

$$\ln(\text{TOTYRPAY}_{i,t}) = \beta_0 + \beta_1 \text{SEO}_{i,t} + \beta_2 X_{i,t} + a_t + a_i + \varepsilon_{i,t} \qquad (5)$$

The dependent variable is the logged value of total D&O compensation. The coefficient of interest is β_1. X is the same control variables as before, plus *PAY_SIZE*, the number of people included in the D&O compensation. This additional control variable is necessary to control for within-firm variation in total compensation caused by changes in the number of people included. Robust standard errors are clustered at the firm level.

Table VI reports the estimation results. The second-stage result of IV regression shows a positive and significant coefficient on *SEO*. The point estimate suggests an average increase of 11.8% in D&O compensation during SEO years. Many control variables show coefficients consistent with our intuition: total compensation increase

with firm size at a decreasing rate, ROE, and the total number of people included in the calculation of total D&O compensation.

IV.2.2. Pay for Performance Sensitivity

Do the increases in D&O compensation represent rewards for better performance? To answer this question, we follow Leone, Wu, and Zimmerman (2006) and estimate the sensitivity of compensation changes to changes in ROA as follows:

$$\Delta Ln(TOTYRPAY_{i,t}) = \beta_0 + \beta_1 \Delta ROA_{i,t} + \beta_2 SEO_{i,t} + \beta_3 SEO_{i,t} * \Delta ROA_{i,t} + \beta_4 X_{i,t} + a_t + a_i + \varepsilon_{i,t} \quad (6)$$

ΔLn(TOTYRPAY) is the yearly change in the logged value of total D&O compensation. The coefficient of interest is β_3, the coefficient of the interaction of *SEO* and *ΔROA*, the change in ROA from year t-1 to year t, where ROA is EBITDA (earnings before interest, taxes, depreciation, and amortization) divided by the book value of total assets. X is the same control variables as in regression (5), except that PAY_SIZE is replaced by ΔPAY_SIZE. Robust standard errors are clustered at the firm level.

Table VII reports the estimation results. The second-stage result of IV regression shows that during non-SEO years, changes in D&O compensation are positively and significantly related to changes in ROA. However, the coefficient on the interaction of *SEO* and *ΔROA* is negative and significant, suggesting the D&O pay-for-performance sensitivity decreases significantly during SEO years.

Taken together with the evidence of higher total D&O compensation, this decrease in pay-for-performance sensitivity implies that compensation efficiency decreases with the availability of SEO proceeds.

IV.3. Firm Performance during SEO years

If the efficiency of both investment and compensation decreases with the infusion of SEO proceeds, firm performance should suffer during SEO years. We proxy firm performance by a forward looking measure, YRRET, yearly buy and hold stock returns, which reflects the anticipated future consequences of the decrease in the efficiency of investment and compensation during SEO years. We do not use accounting based measures such as ROA here because they do not reflect the future consequences. We relate yearly stock returns to SEOs as follows:

$$YRRET_{i,t} = \beta_0 + \beta_1 SEO_{i,t} + \beta_2 X_{i,t} + a_t + a_i + \varepsilon_{i,t} \qquad (7)$$

X is the same control variables as in Table III, except for ROE. We do not include ROE because unlike Table III, the purpose here is to measure SEOs' impact on firm performance.

Table VIII reports the estimation results. Both the second-stage result of IV regression and the OLS estimation result show negative and significant coefficients on *SEO*. The point estimate in the IV regression indicates that, on average, stock returns during SEO years fall by 34.5%. This large drop could be due to market timing in SEOs, as well as to poor performance following SEOs.

IV.4. Underwritten Offering vs. Rights Offerings

In contrast to the US, rights offerings in China are more common than underwritten offerings (see Table I). In rights offerings, new shares are offered at a discount on a pro rata basis; hence, the original ownership structure will stay unchanged if all shareholders exercise their rights. In reality, large shareholders typically exercise their rights in order to retain their control rights and to avoid the cost of not exercising rights. In underwritten offerings, new shares are offered to all potential investors; thus,

many large shareholders may not maintain their share of ownership, leading to more diffusion in ownership concentration.

As mentioned earlier, the 2006 regulation requires that rights offerings be undertaken only through best efforts, and if the subscription rate is less than 70%, the offering fails and all funds already raised must be returned to investors. It also requires that controlling shareholders disclose their intended subscriptions prior to the shareholders' meeting and stick to this number or the offering will fail. These regulations are intended to help protect small shareholders.

Are agency problems less severe when an SEO is conducted through rights offerings rather than underwritten offerings? To answer this question, we separate SEOs into underwritten offerings and rights offerings and re-estimate all regressions. Table IX reports the second-stage IV regression results without reporting control variables, separately for underwritten offerings and rights offerings. Panels A, B, and C report the re-estimation results for investment efficiency, compensation efficiency, and firm performance.

Many of the re-estimation results are similar for both types of SEOs. However, there are some noticeable differences. Panel A shows that, although the efficiency of capital expenditures decreases after both types of offerings, the magnitude of the decrease in underwritten offerings is more than twice that in rights offerings. Panel B reveals that pay-for-performance sensitivity decreases only when the SEO is via underwritten offerings. Panel C reports that, although firm performance declines with both types of SEOs, the magnitude of the decline with underwritten offerings is greater than twice that with rights offerings. It appears underwritten offerings cause greater agency problems than rights offerings.

IV.5. Robustness

In this section, we re-estimate baseline regressions with alternative definitions of key variables, alternative control variables, and an alternative sample construction. To save space, we report only the second-stage IV regression results for all SEOs. Appendix III reports the re-estimation results without showing control variables. The results are summarized below.

IV.5.1. Alternative Definition of SEO

In our baseline regressions, the SEO indicator is turned on for all completed underwritten offerings and rights offerings. We experiment with several alternative definitions for the SEO indicator. First, we exclude small SEOs with proceeds in the 10^{th} percentile. These small SEOs are often made by small market cap firms with highly volatile performance. The estimation results, reported in Append III, Panel A, are robust.

Second, we set the SEO indicator equal to one only in the year following the year of SEO. Although this approach avoids noise due to different timing within the year of SEO (e.g., early vs. late in the year), it underestimates the effects by omitting SEO effects during the year of SEO. The re-estimation results are reported in the Panel B of Appendix III. The results concerning investment efficiency and firm performance are robust. Compensation results show key variables with the same signs as before but their coefficients are no longer significant.

IV.5.2. Alternative IV Construction

Our baseline regressions utilize the 2006 regulation to construct the instrument. As mentioned earlier, the 2008 regulation made the requirements more stringent and does not count stock dividends toward satisfying the past dividend requirement. So we construct an alternative instrument based on both the 2008 regulation and the 2006

regulation to re-estimate regressions in Tables III-VIII. The first-stage results show negative coefficients on IVs. The IV constructed from the 2006 regulation shows a 1% significance level while the IV from the 2008 regulation is insignificant. The re-estimation results, reported in Panel C of Appendix III, remain robust.

IV.5.3. Alternative Dependent Variables

We use alternative dependent variables to estimate changes in investment efficiency. For the likelihood of overinvestment, we use the residual from the expectation model directly as the dependent variable while replacing negative residuals with zero. For acquisition announcement returns, we increase the event window from (-1, 1) to (-2, 2). Both re-estimation results, reported in Panel D of Appendix III, are robust.

IV.5.4. Additional Control Variable

A possible concern with our instruments is that they are related to past dividend payout ratios. If the past dividends are somehow related to dependent variables, the exclusion restriction will be violated. Thus, we re-estimate all regressions with the dividend payout ratio as an additional control.[13] The results, reported in Panel E of Appendix III, are robust.

IV.5.5. Alternative Sample Construction

Finally, we check whether our results are affected by survival bias by using a balanced panel only with firms that have observations in all years from 2000 to 2012. Re-estimation results based on the balanced panel, reported in Panel F of Appendix III, are also robust.

[13] The dividend payout ratio is concurrent in Tables III, IV, VI, VII, and VIII and is lagged in Table V.

V. SEO ANNOUNCEMENT RETURNS AND INVESTMENT AND COMPENSATION EFFICIENCY

A main focus of the SEO literature is announcement returns. In this section we provide average SEO announcement returns in China and relate them to post-SEO changes in investment efficiency and compensation efficiency. To the extent that the announcement returns are based on unbiased expectations of firms' future behavior, we expect SEO announcement returns to be positively related to post-SEO improvements in investment efficiency and compensation efficiency.

SEO announcement returns are calculated as cumulative abnormal returns over the three-day window (-1, 1) surrounding the announcement date, using the market model with the A-share value-weighted index. The estimation window for the market model is 270 trading days prior to the event window. The filing date is used as the announcement date.

V.1. Uni-variate Analyses

Table X reports average SEO announcement returns over the period 2000 through 2012: Panel A for all SEOs; and Panels B and C, separately for underwritten offerings and rights offerings. Column (1) shows an average announcement return of -0.73% for all SEOs. This average negative announcement return is driven entirely by underwritten offerings, which show an average announcement return of -2.25%. The average announcement return for rights offerings is zero. This Chinese evidence is consistent results with Eckbo and Masulis (1995) who document higher announcement returns for rights offerings than for underwritten offerings in the US.

Do these different announcement returns reflect investors' different expectations about how proceeds from underwritten offering will be used vis-à-vis rights offerings? To

answer this question, in the remaining columns of Table X we separate SEOs based on whether the shareholder return-to-investment sensitivity and the pay-for-performance sensitivity increase or decrease during SEO years.

The change in investment sensitivity, *ΔINV_STY*, is defined as $(INV\_STY_{T+1} + INV\_STY_T) - (INV\_STY_{T-1} + INV\_STY_{T-2})$, where year *T* is the year of SEO. *INV_STY* is the yearly buy and hold return divided by the change in log of capital expenditures from year *t*-1 to *t*. As such, *ΔINV_STY* captures the improvement in investment efficiency during the two SEO years in comparison to the two pre-SEO years. The change in pay-for-performance sensitivity is measured in a similar way; *ΔPAY_STY* is defined as $(PAY\_STY_{T+1} + PAY\_STY_T) - (PAY\_STY_{T-1} + PAY\_STY_{T-2})$, where year *T* is the year of SEO and *PAY_STY* is the change in log of compensation per D&O divided by the change in ROA from year *t*-1 to *t*, (Δlog(TOTYRPAY/PAY_SIZE) / ΔROA). *ΔPAY_STY* measures the improvement in compensation efficiency during SEO years in comparison to the two pre-SEO years.

Columns (2) and (3) in Panel B show that when the investment efficiency declines during SEO years, announcement returns for underwritten offerings are negative and significant (-2.56%); when the investment efficiency improves, the announcement return (-1.34%) is insignificant. Announcement returns for rights offerings remain insignificant. Columns (4) and (5) show similar patterns for changes in the compensation efficiency; when the compensation efficiency declines during SEO years, the announcement return for underwritten offerings is negative and significant (-2.49%); when the compensation efficiency improves, the announcement return (-1.39%) is insignificant.

These results suggest that in China, the average negative SEO announcement return is driven by underwritten offerings. Furthermore, the negative investor reaction seems attributable to investor expectations of post-SEO declines in the efficiency of investment and compensation.

V.2. Multivariate Analyses

To check the validity of these uni-variate results, we conduct multivariate analyses linking announcement returns to post-SEO changes in investment and compensation efficiency. We focus only on SEO firms and estimate the following:

$$SEO\_CAR(-1,1)_i = \beta_0 + \beta_1 \Delta \text{Efficiency}_i + \Sigma \beta_j X_{ij} + \varepsilon_{i,t}$$

The key independent variable is the change in investment and compensation sensitivity, *ΔINV_STY* or *ΔPAY_STY*. We expect β_1 to be positive. X is a vector of control variables, which include *DAYS_AFTER_REPORT*, *DEALSIZE*, and firm characteristics. *DAYS_AFTER_REPORT* is the number of days between the filing date and the firm's closest disclosure date. US data shows this variable is an important determinant of SEO announcement returns (Korajczyk, Lucas, and McDonald, 1991). The greater the number of days between the two dates, the less the public knows about the most current situation of the firm after it files its SEO proposal. *DEALSIZE* is measured by the logged value of net new capital raised through SEO. Firm characteristics include firm size, cash (Cash/Total Assets), leverage, and the previous year's stock return. All firm characteristic variables are lagged by a year. We include year- and industry fixed effects. Robust standard errors are clustered at the industry level.

Tables XI reports the estimation results relating SEO announcement returns to investment efficiency changes for all SEOs, underwritten offerings, and rights offerings. As expected, changes in investment sensitivity are positively related to SEO

announcement returns. The positive relation is significant for both types of SEOs; however, the difference in the magnitude of the coefficients seems to suggest stronger effects for underwritten offerings.

Table XII reports the estimation results for compensation efficiency changes. The relation between SEO announcement returns and post-SEO changes in pay-for-performance sensitivity is positive and significant only for underwritten offerings.

VI. CONCLUSION

Using a sample of Chinese publicly-listed firms, we find robust evidence that investment and compensation policies become unfriendly to shareholders during SEO years. Specifically, capital expenditures yield lower stock returns during SEO years than non-SEO years. The likelihood to overinvest also increases during SEO years. D&O compensation increases but their pay-for-performance sensitivity decreases during SEO years. These results are obtained after addressing endogeneity issues in the choice of SEOs using instruments constructed with exogenous regulatory shocks on the eligibility to issue SEOs.

These changes in the efficiency of investment and compensation policies during SEO years are related to abnormal stock returns surrounding SEO announcements. SEO firms with greater deterioration in post-SEO investment and compensation policies are met with more negative investor reactions at the time of SEO announcements.

Results imply that agency problems associated with free cash flows (Jensen, 1986) are an important explanator for negative investor reactions to SEO announcements. In so far as shareholders are concerned, SEO proceeds are often invested unproductively. D&Os also seem to indulge in self-serving behavior with SEO proceeds, as they increase

their own compensation while decreasing pay-for-performance sensitivity during SEO years.

Our findings call for better corporate governance mechanisms to safeguard shareholders against the unproductive use of SEO proceeds and D&Os' self-serving behavior. SEOs are already heavily regulated in China; therefore, we do not call for more regulation. Regulations often lead to unintended consequences with worse outcomes. We are searching for a market-based governance mechanism that provides greater transparency to shareholders so they can better mitigate agency problems arising from free cash flows obtained through SEOs.

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Table I: Sample description.

This table reports, by year, the number of firms in our sample and seasoned equity offerings. The sample includes Chinese firms listed on the Shanghai Stock Exchange and the Shenzhen Stock Exchange from 2000-2012. Financial firms, ST (special treatment), and *ST firms are excluded. Firms are classified as ST and *ST if they have two (ST) and three (*ST) consecutive years of negative net profit. Column (1) shows the number of firms in the full sample for each year. Columns (2)-(4) show the number of underwritten offerings, rights offerings, and total public offerings each year by announcement dates. Columns (5)-(7) show the number of different types of public offerings each year by offering dates.

Year	**Full**	**By announcement date**			**By offering date**		
		Underwritten	**Rights**	**Total**	**Underwritten**	**Rights**	**Total**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
2000	908	30	155	185	13	141	154
2001	982	34	46	80	22	109	131
2002	1,046	5	33	38	24	20	44
2003	1,110	11	12	23	14	24	38
2004	1,206	6	2	8	10	22	32
2005	1,218	0	1	1	5	2	7
2006	1,250	6	1	7	5	2	7
2007	1,378	50	14	64	22	6	28
2008	1,454	11	11	22	34	9	43
2009	1,549	8	10	18	10	8	18
2010	1,896	10	10	20	9	11	20
2011	2,172	5	8	13	9	14	23
2012	2,290	1	1	2	5	7	12
Total	18,459	177	304	481	182	375	557

Table II: Summary statistics.

This table reports summary statistics of all key variables. Panel A reports the statistics for the full sample. Panel B reports the means of each variable for the SEO and non-SEO sample. Column (4) includes observations in the year of underwritten offerings and the following year; Column (5), the year of rights offerings and the following year; Column (6), non-SEO sample. Columns (7) and (8) report the differences between underwritten or rights offerings and non-SEO observations. Panel C reports the means of pre- and post-SEO samples. Column (9) reports means for observations over two years prior to an SEO; Column (10), over the two SEO years. Column (11) reports the difference between pre- and post-SEO sample. Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively. Variable definitions are provided in Appendix I.

	Panel A: Full Sample			**Panel B: SEO vs. Non-SEO sample**					**Panel C: Pre-SEO sample vs. Post-SEO sample**		
	Mean	**Median**	**Std. Dev**	**Under written**	**Rights Offerings**	**Non-SEO Sample**	**(4)-(6) Diff**	**(5)-(6) Diff**	**Pre-SEO**	**Post-SEO**	**(10)-(9)**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Variables of interest											
AFFECT_06	0.33	0.00	0.47								
AFFECT_08	0.43	0.00	0.50								
IV_06	0.11	0.00	0.31								
IV_08	0.09	0.00	0.29								
CAPEX	427.92	69.16	3182.75	910.11	307.24	423.17	486.94***	-115.93	378.35	502.93	124.59**
YRRET	0.24	0.00	0.89	0.18	0.04	0.25	-0.07	-0.21***	0.39	0.08	-0.31***
AB_INV	0.00	-0.03	0.17	0.04	0.03	-0.00	0.05***	0.03***	0.03	0.03	0.00
ACQ_CAR(-1,1)	0.00	-0.00	0.08	0.00	0.00	0.00	-0.00	-0.01	0.00	0.00	-0.01
TOTYRPAY	2.33	1.62	2.70	2.95	1.59	2.34	0.61***	-0.75***	2.35	2.09	-0.26*
PAY_SIZE	13.34	13.00	4.62	13.71	12.15	13.48	0.23	-1.33***	13.30	12.71	-0.59**
ROA	0.08	0.06	0.10	0.08	0.08	0.07	0.01***	0.01***	0.11	0.08	-0.03***
TOBINQ	2.61	2.03	1.89	1.93	2.46	2.63	-0.70***	-0.17**	2.90	2.29	-0.61***
MTB	4.00	2.99	3.28	2.72	3.57	4.01	-1.32	-0.47***	4.58	3.30	-1.29***
SEO_CAR(-1,1)	-0.01	-0.12	0.05								
ΔINV_STY	-0.00	0.00	0.07								
ΔPAY_STY	0.26	0.00	1.73								

Table II (Continued)

Control variables											
FIRM_AGE	7.13	7.00	5.03	7.01	5.83	7.19	-0.18	-1.36***	4.34	6.21	1.88***
SALES	3.94	0.81	34.81	6.76	2.41	4.43	2.32	-2.03	2.81	3.83	1.02**
ROE	0.04	0.07	0.50	0.09	0.06	0.04	0.04	0.02	0.13	0.07	-0.06***
LEVERAGE	0.25	0.24	0.18	0.26	0.27	0.25	0.01	0.02***	0.27	0.27	0.00
SALES_GR	0.23	0.15	0.56	0.27	0.20	0.24	0.03	-0.03	0.30	0.22	-0.08***
PPE/TA	0.32	0.29	0.20	0.35	0.36	0.31	0.03***	0.05***	0.37	0.36	-0.02**
%_IND_DIR	0.30	0.32	0.13	0.30	0.18	0.31	-0.01**	-0.13***	0.24	0.22	-0.02**
%_STATE_OWN	0.19	0.00	0.25	0.18	0.29	0.19	-0.01	0.10***	0.30	0.26	-0.04***
%_EXE_OWN	0.06	0.00	0.15	0.03	0.00	0.06	-0.03***	-0.06***	0.03	0.01	-0.01***
NONTRDPCT	0.28	0.00	0.32	0.25	0.48	0.20	0.05***	0.28***	0.48	0.41	-7.18***
DIVPRT	0.26	0.17	0.31	0.35	0.34	0.25	0.10***	0.10***	0.28	0.35	0.06***
DAYS_AFTER_REPORT	0.32	0.11	0.45								
DEALSIZE	5.90	5.83	0.99								

Table III: Investment Efficiency: Stock Returns-to-Investment Sensitivity.

This table estimates the stock returns-to-capital expenditures sensitivity during SEO years. The dependent variable is the yearly buy and hold return. The independent variable of main interest is the interaction of *SEO* and the logged value of capital expenditures. Column (1) reports the second-stage estimation result of IV regression; columns (2), the OLS regression result. The first-stage regression results are reported in Appendix II, panel A. The sample period covers 2000-2012. All regressions include firm- and year fixed effects. Robust standard errors clustered at the firm level are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively. Variable definitions are provided in Appendix I.

Dependent Variable	**YRRET**	
	Second-Stage IV Result	**OLS Result**
	(1)	**(2)**
SEO_{t-1} x ln($CAPEX_{t-1}$)	-0.458***	0.009
	(0.08)	(0.01)
SEO_{t-1}	-0.033	-0.076*
	(0.07)	(0.04)
ln($CAPEX_{t-1}$)	0.044***	-0.020***
	(0.01)	(0.01)
ln(FIRM_AGE)	0.038	0.122***
	(0.06)	(0.02)
SALES	-0.008***	-0.002***
	(0.00)	(0.00)
SALES2	0.000**	0.000**
	(0.00)	(0.00)
ROE	0.042***	0.036***
	(0.01)	(0.01)
LEVERAGE	-0.477***	-0.297***
	(0.07)	(0.06)
PPE/TA	-0.198***	-0.087
	(0.07)	(0.06)
SALES_GR	0.137***	0.138***
	(0.02)	(0.02)
%_IND_DIR	-0.110	-0.034
	(0.07)	(0.06)
%_STATE_OWN	-0.107**	-0.022
	(0.05)	(0.04)
%_EXE_OWN	-0.683	0.092
	(0.42)	(0.26)
NONTRDPCT	-0.002***	-0.002***
	(0.00)	(0.00)
Constant	0.362***	0.785***
	(0.12)	(0.06)
Firm & Year FE	Y	Y
Observations	12,282	16,303
Adjusted R-squared	0.651	0.618

Table IV: Likelihood of Over-Investments during SEO Years.

This table reports the likelihood of over-investments during SEO years. To construct the overinvestment indicator, we first estimate the investment model in Richardson (2006): $Inv_{i,t} = \beta_0 + \beta_1 Tobin's\ Q_{i,t-1} + \beta_2 Leverage_{i,t-1} + \beta_3 Cash_{i,t-1} + \beta_4 Firm\_Age_{i,t-1} + \beta_5 Ln(TA)_{i,t-1} + \beta_6 YRRET_{i,t-1} + \beta_7 Inv_{i,t-1} + a_t + a_j + \varepsilon_{i,t.}$ The residuals are used as a measure of abnormal investment, AB_INV. The dependent variable, INV_OVER, is equal to one if AB_INV is above 0.08 (one half of the sample standard deviation) and zero otherwise. Column (1) reports the second-stage result of IV regression and column (2) reports the OLS regression result. The first-stage regression results are reported in Appendix II, panel B. The sample period covers 2000-2012. All regressions include year fixed effects. Robust standard errors clustered at the firm level are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively. Variable definitions are provided in Appendix I.

Dependent Variable	**INV_OVER**	
	Second-Stage IV Result	**OLS Result**
	(1)	**(2)**
SEO	1.631***	0.737***
	(0.55)	(0.12)
ln(FIRM_AGE)	-1.108***	-1.315***
	(0.33)	(0.20)
SALES	-0.025*	0.006
	(0.01)	(0.00)
SALES2	0.000**	-0.000
	(0.00)	(0.00)
ROE	2.558***	0.405***
	(0.52)	(0.15)
LEVERAGE	1.203***	0.721**
	(0.37)	(0.33)
PPE/TA	3.342***	3.445***
	(0.38)	(0.36)
SALES_GR	0.101	0.122**
	(0.06)	(0.05)
%_IND_DIR	-0.269	-0.311
	(0.45)	(0.41)
%_STATE_OWN	-0.131	-0.161
	(0.22)	(0.21)
%_EXE_OWN	0.759	0.309
	(1.97)	(1.63)
NONTRDPCT	-0.004	-0.004
	(0.00)	(0.00)
Year Dummies	Y	Y
Observations	7,193	8,616
Pseudo R-squared	0.0585	0.0579

Table V: Acquisition Announcement Returns.

This table estimates the impact of seasoned equity offerings on acquisition announcement returns of the acquiring firm. The dependent variable is cumulative abnormal returns over a three-day event window (-1, 1) surrounding the announcement date, using the market model with benchmark returns of the A-share equally-weighted index. Column (1) reports the second-stage estimation result of IV regression and column (2) reports the OLS regression result. The first-stage regression results are reported in Appendix II, panel B. The sample period covers 2000-2012. All regressions include industry- and year fixed effects. Robust standard errors clustered at the industry level are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively. Variable definitions are provided in Appendix I.

Dependent Variable	**ACQ_CAR(-1,1)**	
	Second-Stage IV Result	**OLS Result**
	(1)	**(2)**
SEO_{t-1}	-0.027*	-0.002
	(0.01)	(0.00)
$\ln(FIRM\_AGE)_{t-1}$	-0.008	-0.002
	(0.01)	(0.00)
$SALES_{t-1}$	-0.000	-0.000
	(0.00)	(0.00)
$SALES2_{t-1}$	0.000*	0.000
	(0.00)	(0.00)
ROE_{t-1}	-0.004**	-0.003**
	(0.00)	(0.00)
$LEVERAGE_{t-1}$	-0.005	-0.005
	(0.01)	(0.01)
PPE/TA_{t-1}	-0.000	0.001
	(0.00)	(0.00)
$SALES\_GR_{t-1}$	0.014	0.010
	(0.01)	(0.01)
$\%\_IND\_DIR_{t-1}$	0.035**	0.029***
	(0.01)	(0.01)
$\%\_STATE\_OWN_{t-1}$	-0.002	-0.004
	(0.01)	(0.01)
$\%\_EXE\_OWN_{t-1}$	-0.030	-0.016**
	(0.02)	(0.01)
$NONTRDPCT_{t-1}$	0.000	0.000
	(0.00)	(0.00)
Constant	-0.005	-0.014
	(0.02)	(0.02)
Industry & Year FE	Y	Y
Observations	3,764	4,792
Adjusted R-squared	0.005	0.005

Table VI: Director and Top Officer Compensation Level.

This table estimates the change in the compensation level for directors and top officers during SEO years. The dependent variable is the logged value of total D&O cash compensation, the sum of salaries and bonuses to all directors and top officers. Column (1) reports the second-stage result of IV regression and columns (2) reports the OLS regression result. The first-stage regression results are reported in Appendix II, panel C. The sample period covers 2000-2012. All regressions include firm- and year fixed effects. Robust standard errors clustered at the firm level are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively. Variable definitions are provided in Appendix I.

Dependent Variable	**ln(TOTYRPAY)**	
	Second-Stage IV Result	**OLS Result**
	(1)	**(2)**
SEO	0.118*	0.014
	(0.07)	(0.02)
ln(FIRM_AGE)	-0.040	-0.011
	(0.06)	(0.02)
SALES	0.012***	0.002**
	(0.00)	(0.00)
SALES2	-0.000***	-0.000***
	(0.00)	(0.00)
ROE	0.042***	0.024**
	(0.01)	(0.01)
LEVERAGE	-0.013	-0.018
	(0.08)	(0.07)
PPE/TA	0.027***	-0.214**
	(0.01)	(0.08)
SALES_GR	-0.277***	0.031***
	(0.09)	(0.01)
%_IND_DIR	-0.021	0.022
	(0.08)	(0.07)
%_STATE_OWN	0.030	0.038
	(0.04)	(0.04)
%_EXE_OWN	1.495***	0.759***
	-0.51	-0.27
NONTRDPCT	-0.001*	-0.002***
	(0.00)	(0.00)
PAY_SIZE	0.062***	0.062***
	(0.00)	(0.00)
Constant	-1.118***	-1.064***
	(0.12)	(0.06)
Firm & Year FE	Y	Y
Observations	12,790	15,913
Adjusted R-squared	0.812	0.809

Table VII: Pay-for-Performance Sensitivity.

This table estimates changes in the sensitivity of cash compensation to earnings during SEO years. The dependent variable is the yearly change in the logged value of total D&O cash compensation. Column (1) reports the second-stage result of IV regression and column (2) reports the OLS regression result. The first-stage regression results are reported in Appendix II, panel D. The sample period covers 2000-2012. All regressions include firm- and year fixed effects. Robust standard errors clustered at the firm level are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively. Variable definitions are provided in Appendix I.

Dependent Variable	**ΔIn(TOTYRPAY)**	
	Second-Stage IV Result	**OLS Result**
	(1)	**(2)**
SEO x ΔROA	-68.511**	-0.015
	(31.77)	(0.35)
SEO	-0.126*	-0.002
	(0.07)	(0.02)
ΔROA	1.820**	0.264***
	(0.72)	(0.08)
ln(FIRM_AGE)	0.070**	0.003
	(0.03)	(0.02)
SALES	-0.003	-0.000
	(0.00)	(0.00)
SALES2	0.000	0.000
	(0.00)	(0.00)
ROE	-0.011	0.016
	(0.02)	(0.01)
LEVERAGE	-0.206***	-0.164***
	(0.05)	(0.04)
PPE/TA	0.050	-0.124***
	(0.08)	(0.04)
SALES_GR	0.087***	0.080***
	(0.01)	(0.01)
%_IND_DIR	0.031	-0.014
	(0.06)	(0.06)
%_STATE_OWN	0.049*	0.057**
	(0.03)	(0.02)
%_EXE_OWN	0.735***	0.519***
	(0.24)	(0.17)
NONTRDPCT	-0.001*	-0.001**
	(0.00)	(0.00)
ΔPAY_SIZE	0.051***	0.050***
	(0.01)	(0.00)
Constant	0.026	0.318***
	(0.11)	(0.05)
Firm & Year FE	Y	Y
Observations	11,957	13,613
Adjusted R-squared	0.102	0.099

Table VIII: Stock Returns.

This table estimates the effect of SEOs on shareholder value. The dependent variable is the yearly buy and hold return. Column (1) reports the second-stage result of IV regression and column (2) reports the OLS regression result. The first-stage regression results are reported in Appendix II, Panel E. The sample period covers 2000-2012. All regressions include firm- and year fixed effects. Robust standard errors clustered at the firm level are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively. Variable definitions are provided in Appendix I.

Dependent Variable	**YRRET**	
	Second-Stage IV Result	**OLS Result**
	(1)	**(2)**
SEO	-0.345***	-0.087***
	(0.08)	(0.02)
ln(FIRM_AGE)	0.083**	0.310***
	(0.04)	(0.02)
SALES	-0.004**	-0.002***
	(0.00)	(0.00)
SALES2	0.000*	0.000**
	(0.00)	(0.00)
LEVERAGE	-0.336***	-0.385***
	(0.05)	(0.06)
PPE/TA	-0.159**	-0.089
	(0.06)	(0.06)
SALES_GR	0.122***	0.142***
	(0.02)	(0.02)
%_IND_DIR	-0.049	0.024
	(0.06)	(0.06)
%_STATE_OWN	-0.050	-0.003
	(0.04)	(0.04)
%_EXE_OWN	-0.186	-0.028
	(0.35)	(0.20)
NONTRDPCT	-0.002***	-0.001**
	(0.00)	(0.00)
Constant	0.883***	0.470***
	(0.09)	(0.05)
Firm & Year FE	Y	Y
Observations	14,362	17,966
Adjusted R-squared	0.634	0.576

Table IX: Underwritten Offerings vs. Rights Offerings.

This table re-estimates Tables III – VIII, separately for underwritten offerings and rights offerings. Panel A reports re-estimation results of investment efficiency tests (Tables III to V); Panel B, re-estimation results of compensation efficiency tests (Tables VI and VII); Panel C, re-estimation results of stock returns (Table VIII). All results are the second-stage results of IV regressions specified in Tables III – VIII. The sample period covers 2000-2012. All regressions include firm- and year fixed effects except columns (5) and (6) in panel A, which include industry- and year-fixed effects. Robust standard errors clustered at the firm level are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively. Variable definitions are provided in Appendix I.

Panel A

Dependent Variable	**YRRET**		**INV_OVER**		**ACQ_CAR(-1,1)**	
	Underwritten	**Rights**	**Underwritten**	**Rights**	**Underwritten**	**Rights**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
SEO_{t-1} x ln($CAPEX_{t-1}$)	-1.221***	-0.448***				
	(0.20)	(0.11)				
SEO_{t-1}	0.000	-0.151**			-0.022**	-0.031*
	(0.06)	(0.07)			(0.01)	(0.02)
SEO			0.997**	1.519***		
			(0.45)	(0.50)		
Controls	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y			N	N
Year FE (Dummies)	Y	Y	Y	Y	Y	Y
Industry FE					Y	Y
Observations	12,282	12,282	7,193	7,193	3,764	3,764
Adjusted R-squared	0.653	0.650			0.005	0.005
Pseudo R-squared			0.0580	0.0585		

Panel B

Dependent Variable	**ln(TOTYRPAY)**		**Δln(TOTYRPAY)**	
	Underwritten	**Rights**	**Underwritten**	**Rights**
	(1)	**(2)**	**(3)**	**(4)**
SEO	0.116**	0.120*	-0.098*	0.020
	(0.05)	(0.07)	(0.05)	(0.05)
SEO x ΔROA			-109.002***	98.865**
			(33.63)	(50.17)
Controls	Y	Y	Y	Y
Firm & Year FE	Y	Y	Y	Y
Observations	12,790	12,790	11,957	11,957
Adjusted R-squared	0.812	0.812	0.102	0.102

Panel C

Dependent Variable	**YRRET**	
	Underwritten	**Rights**
	(1)	**(2)**
SEO	-0.430***	-0.171**
	(0.07)	(0.07)
Controls	Y	Y
Firm & Year FE	Y	Y
Observations	14,362	14,362
Adjusted R-squared	0.635	0.634

Table X: SEO Announcement Returns.

This table shows the average cumulative abnormal returns (CARs) surrounding the announcement date of seasoned equity offerings from year 2000 to 2012. CARs are calculated based on the market model, with an estimation window of 270 trading days prior to event window. SEO_CAR(-1, 1) is the cumulative abnormal return from day -1 to day 1 surrounding the announcement date. Panel A reports the CARs for all SEOs, and panels B and C report CARs of underwritten offerings and right offerings, respectively. Column (1) shows all announcement returns. The remaining columns separate cases into which the return-to-capital expenditure sensitivity or pay-for-performance sensitivity increases or decreases during SEO years. The investment sensitivity, *INV_STY*, is yearly stock returns / (log($CAPEX_t$) - log($CAPEX_{t-1}$)). The change in investment sensitivity, *ΔINV_STY*, is defined as (INV_STY_{T+1} + INV_STY_T) - (INV_STY_{T-1} + INV_STY_{T-2}), where year T is the year of an SEO. We divide our sample into two groups by the sign of *ΔINV_STY*, and report the mean SEO_CAR(-1,1) of each group in column (2) and (3), respectively. We also define pay-for-performance sensitivity, PAY_STY, as Δlog(TOTYRPAY/PAY_SIZE) / ΔROA. The change in pay-for-performance sensitivity, ΔPAY_STY, is defined as (PAY_STY_{T+1} + PAY_STY_T) - (PAY_STY_{T-1} + PAY_STY_{T-2}), where year T is the year of an SEO. We divide the sample by the sign of ΔPAY_STY, and report the mean SEO_CAR (-1,1) of each group in column (4) and (5). Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively.

Variable	**Total**	**ΔINV_STY**		**Δ PAY_STY**	
		Positive	**Negative**	**Positive**	**Negative**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Panel A: All Public Offering					
N	557	95	461	71	485
SEO_CAR(-1,1)	-0.73%***	-0.93%*	-0.69%***	-1.12%	-0.67%***
t-value	*(-3.28)*	*(-1.82)*	*(-2.78)*	*(-1.63)*	*(-2.87)*
Panel B: Underwritten Offering					
N	182	47	135	40	142
SEO_CAR(-1,1)	-2.25%***	-1.34%	-2.56%***	-1.39%	-2.49%***
t-value	*(-5.65)*	*(-1.48)*	*(-5.92)*	*(-1.33)*	*(-5.96)*
Panel C: Rights Offering					
N	375	48	327	31	344
SEO_CAR(-1,1)	0.00%	-0.53%	0.09%	-0.77%	0.08%
t-value	*(0.03)*	*(-1.08)*	*(0.31)*	*(-0.92)*	*(0.29)*

Table XI: SEO Announcement Returns and Changes in Investment Efficiency.

This table reports estimation results relating SEO announcement returns to investment efficiency changes for all SEOs, underwritten offerings, and rights offerings. The sample consists of the 557 SEO cases used in previous regressions. SEO_CAR(-1,1), the three-day cumulative abnormal return, is based on a market model with the value-weighted A-share index return, using an estimation window of 270 trading days prior to the event window. The investment sensitivity, *INV_STY*, is yearly stock returns / (log($CAPEX_t$) - log($CAPEX_{t-1}$)). The change in investment sensitivity, *ΔINV_STY*, is defined as (INV_STY_{T+1} + INV_STY_T) - (INV_STY_{T-1} + INV_STY_{T-2}), where year T is the year of an SEO. Column (1) reports regression estimate for all SEOs, Columns (2) and (3) report regression estimates separately for underwritten offerings and rights offerings, respectively. Robust standard errors clustered at the industry level are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively. Variables definitions are provided in Appendix I.

Dependent variable	**SEO_CAR (-1, 1)**		
	Full	**Underwritten**	**Rights**
	(1)	**(2)**	**(3)**
ΔINV_STY	0.194***	0.214***	0.161***
	(0.01)	(0.01)	(0.01)
DAYS_AFTER_REPORT	-0.003	0.014	-0.012
	(0.01)	(0.01)	(0.01)
DEALSIZE	-0.040**	-0.039**	-0.029
	(0.02)	(0.02)	(0.04)
$\log(SALES_{t-1})$	0.001	0.008	-0.008
	(0.00)	(0.01)	(0.01)
$CASH_{t-1}$/TOTAL $ASSET_{t-1}$	-0.013	-0.045	0.047
	(0.02)	(0.06)	(0.05)
$DEBT_{t-1}$/TOTAL $ASSET_{t-1}$	-0.043	-0.085***	-0.024
	(0.03)	(0.01)	(0.05)
$STOCK\_RETURN_{t-1}$	-0.001	-0.002	-0.007
	(0.00)	(0.00)	(0.01)
Constant	-0.107	-0.188	0.017
	(0.04)	(0.07)	(0.06)
Industry FE	Y	Y	Y
Year FE	Y	Y	Y
Observations	195	103	92
R-squared	0.225	0.421	0.436

Table XII: SEO Announcement Returns and Changes in Pay-for-Performance Sensitivity.

This table reports estimation results relating SEO announcement returns to compensation efficiency changes for all SEOs, underwritten offerings, and rights offerings. The sample consists the 557 SEO cases used in previous regressions. SEO_CAR(-1,1), the three-day cumulative abnormal return, is based on the market model with the value-weighted A-share index return, using an estimation window of 270 trading days prior to the event window. Pay-for-performance sensitivity, *PAY_STY*, is Δlog(TOTYRPAY/PAY_SIZE) / ΔROA. The change in pay-for-performance sensitivity, *ΔPAY_STY*, is defined as (PAY_STY_{T+1} + PAY_STY_{T}) - (PAY_STY_{T-1} + PAY_STY_{T-2}), where year T is the year of an SEO. Column (1) reports regression estimates for all SEOs, Column (2) and (3) report regression estimates separately for underwritten offerings and rights offerings, respectively. Robust standard errors clustered at the industry level are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively. Variables definitions are provided in Appendix I.

Dependent variable	**SEO_CAR (-1, 1)**		
	Full	**Underwritten**	**Rights**
	(1)	**(2)**	**(3)**
ΔPAY_STY	-0.001	0.011**	-0.002
	(0.00)	(0.00)	(0.00)
DAYS_AFTER_REPORT	0.015	0.016	0.000
	(0.01)	(0.01)	(0.01)
DEALSIZE	-0.051***	-0.038***	-0.059
	(0.01)	(0.01)	(0.05)
$\log(SALES_{t-1})$	0.003	0.012	-0.009
	(0.01)	(0.01)	(0.02)
$CASH_{t-1}$/TOTAL $ASSET_{t-1}$	0.007	-0.041	0.044
	(0.02)	(0.12)	(0.10)
$DEBT_{t-1}$/TOTAL $ASSET_{t-1}$	-0.074**	-0.062	-0.013
	(0.03)	(0.04)	(0.07)
$STOCK\_RETURN_{t-1}$	0.004	0.010**	-0.008
	(0.00)	(0.00)	(0.01)
Constant	-0.051	-0.169	0.008
	(0.06)	(0.11)	(0.11)
Industry FE	Y	Y	Y
Year FE	Y	Y	Y
Observations	132	72	60
R-squared	0.197	0.420	0.446

Appendices

Appendix I: Variable definitions.

Variable Name	Description
Key variables	
SEO	An indicator variable equal to one in SEO years (the year of SEO offerings and the year after), and zero otherwise.
SEO_CAR(-1,1)	Cumulative abnormal returns over a three-day event window surrounding the announcement date of seasoned equity offerings.
AFFECT_06	An indicator variable equal to one if a firm has distributed less than 20% of the distributable profits realized over the past three years as of year 2005, and zero otherwise.
AFFECT_08	An indicator variable equal to one if a firm has distributed less than 30% of distributable profits realized over the past three years as of year 2007, and zero otherwise.
IV_06	Instrumental variable constructed based on the 2006 regulation: IV_06 = AFFECT_06 * POST_REG, where POST_REG equals one when the year of observation is 2008 or later.
IV_08	Instrumental variable constructed based on the 2008 regulation: IV_08 = AFFECT_08 * POST_REG, where POST_REG equals one when the year of observation is 2010 or later.
CAPEX	Capital expenditures: cash paid to acquire fixed assets, intangible assets, and other long-term assets, measured in millions of RMB.
AB_INV	The residual of the following investment model in Richardson (2006): $Inv_{i,t} = \beta_0 + \beta_1 Tobin's\ Q_{i,t-1} + \beta_2 Leverage_{i,t-1} + \beta_3 Cash_{i,t-1} + \beta_4 Firm\_Age_{i,t-1} + \beta_5 Ln(TA)_{i,t-1} + \beta_6 YRRET_{i,t-1} + \beta_7 Inv_{i,t-1} + a_t + a_j + \varepsilon_{i,t}$, where $Inv_{i,t}$ is net investments firm i makes in year t, defined as the ratio of (CAPEX – cash received from disposals of fixed assets, intangible assets, and other assets) to total assets at the beginning of the year.
INV_OVER	An indicator variable equal to one if AB_INV is above 0.08 (one-half of the sample standard deviation) and zero otherwise.
TOBINQ	Tobin's Q: (year-end market cap + total liabilities – wages payable – dividend payable – deferred tax liability)/(total asset – unamortized expenditure – intangible asset – deferred tax asset).
YRRET	The annual buy and hold returns on firm *i*'s stock in year *t*.
ACQ_CAR(-1,1)	Cumulative abnormal return over the three-day event window surrounding acquisition announcements.
TOTYRPAY	Total D&O cash compensation: the sum of cash salaries and bonuses to board chair, CEO, vice president, board members, and key management members, measured in millions of RMB.
PAY_SIZE	Number of people included in total D&O cash compensation, TOTYRPAY.
ROA	Return on assets: the ratio of EBITDA (earnings before interest, taxes, depreciation, and amortization) to total assets.
MTB	Market-to-book ratio: market capitalization / net asset.
ΔINV_STY	Change in investment sensitivity between pre- and post-SEOs: The investment sensitivity, *INV_STY*, is yearly stock returns / (log($CAPEX_t$) - log($CAPEX_{t-1}$)). The change in investment sensitivity, *ΔINV_STY*, is defined as (INV_STY_{T+1} + INV_STY_T) – (INV_STY_{T-1} + INV_STY_{T-2}), where year T is the year of an SEO.
ΔPAY_STY	Changes in compensation sensitivity between pre- and post-SEOs: Pay-for-performance sensitivity, *PAY_STY*, is Δlog(TOTYRPAY/PAY_SIZE)/ΔROA. The change in pay-for-performance sensitivity, *ΔPAY_STY*, is defined as (PAY_STY_{T+1} + PAY_STY_T) – (PAY_STY_{T-1} + PAY_STY_{T-2}), where year T is the year of an SEO.
Control variables	
FIRM_AGE	Number of years since a firm's IPO.
SALES	Total sales, measured in billions of RMB.
LEVERAGE	The ratio of total debts (short term debt + long term debt) to total assets.
ROE	Return on equity: the ratio of net profit to owner's equity.
SALES_GR	SALES growth rate from year *t*-1 to year *t*.
PPE/TA	The ratio of tangible asset (properties, plants, and equipment) to total assets.

Appendix I (Continued)

Control variables

DIVPRT	Dividend Payout Ratio.
%_IND_DIR	Percentage of independent directors on the board.
%_STATE_OWN	Percentage of shares held by the government through a designated government agency.
%_EXE_OWN	Percentage of shares held by board chair, CEO, vice president, supervisors, other board members, and key management members.
NONTRDPCT	Percentage of non-tradable shares.
DAYS_AFTER_REPORT	Number of days in hundred between a company's SEO announcement date and its most recent financial report disclosure date.
DEALSIZE	Log(Net Capital Raised Through an SEO).

Appendix II: First-stage Regression Results.

Panel A. First-stage results for Table III.

Column (1) is estimated with conditional logit regression at the firm level, and Column (2) is estimated with OLS regression

Dependent Variable	**SEO**	**SEO x ln(CAPEX)**
	(1)	**(2)**
IV_06	-1.275***	-0.020
	(0.47)	(0.05)
LAG2_MTB	0.145***	0.029***
	(0.03)	(0.01)
Controls	Y	Y
Firm FE		Y
Year FE (Dummies)	Y	Y
Observations	5,213	14,290
F-test (IVs)	31.73	16.66
Prob > F (IVs)	0.0000	0.0000

Panel B. First-stage results for Tables IV and V.

The following result is estimated with conditional logit regression at the firm level

Dependent Variable	**SEO**
IV_06	-1.400***
	(0.48)
LAG2_MTB	0.155***
	(0.03)
Controls	Y
Year Dummies	Y
Observations	5,246
chi2 (IVs)	39.19
Prob > chi2 (IVs)	0.0000

Panel C. First-stage results for Table VI.

The following result is estimated with conditional logit regression at the firm level

Dependent Variable	**SEO**
IV_06	-1.174**
	(0.58)
LAG2_MTB	0.179***
	(0.03)
Controls	Y
Year Dummies	Y
Observations	4,557
chi2 (IVs)	46.08
Prob > chi2 (IVs)	0.0000

Panel D. First-stage results for Table VII.

Column (1) is estimated with conditional logit regression at the firm level, and Column (2) is estimated with OLS regression

Dependent Variable	**SEO**	**SEO x ΔROA**
	(1)	**(2)**
IV_06	-0.760	0.000
	(0.59)	(0.00)
LAG2_MTB	0.164***	-0.000*
	(0.03)	(0.00)
Controls	Y	Y
Firm FE		Y
Year FE (Dummies)	Y	Y
Observations	2,897	11,957
F-test (IVs)	22.74	1.63
Prob > F (IVs)	0.0000	0.1966

Panel E. First-stage results for Table VIII.

The following result is estimated with conditional logit regression at the firm level

Dependent Variable	**SEO**
IV_06	-1.401***
	(0.48)
LAG2_MTB	0.155***
	(0.03)
Controls	Y
Year Dummies	Y
Observations	5,246
chi2 (IVs)	39.78
Prob > chi2 (IVs)	0.0000

Panel F. Relation between current MTB ratio and two-year-lagged MTB ratio.

Dependent Variable	**MTB**	
	(1)	**(2)**
Lag MTB	0.321***	0.310***
	(0.01)	(0.01)
Lag2 MTB		-0.010
		(0.01)
Constant	2.619***	2.744***
	(0.04)	(0.05)
Firm FE	Y	Y
Observations	16,044	14,465
Adjusted R-squared	0.389	0.392

Appendix III: Robustness Tests.

This table reports re-estimation results of Table III-VIII with alternative SEO definitions, an alternative instrument, and alternative definitions of dependent variables, an additional control variable, and an alternative sample construction. All reported results are second-stage IV regression results. Panel A shows re-estimation results while excluding small SEOs with proceeds in the 10th percentile. Panel B shows re-estimation results while excluding the year of SEO in the definition of *SEO*. Panel C shows re-estimation results with an additional instrument variable constructed based on the 2008 regulation. Panel D re-estimates Table V and VI with alternative dependent variables: The overinvestment indicator variable, INV_OVER, is the residual of the investment expectation model and 0 if the residual is negative, and ACQ_CAR(-1, 1) is replaced with CAR calculated over (-2, 2) event window. Panel E shows re-estimation results with an additional control variable, *DIVPRT*, dividend payout ratio. Panel F shows re-estimation results with a balanced panel. Definitions of all variables are provided in Appendix I. Robust standards errors reported in parentheses are clustered at the firm level, except when acquisition announcement returns are the dependent variable, in which case standard errors are clustered at the industry level. Coefficients marked with *, **, and *** are significant at 10%, 5%, 1%, respectively. Variable definitions are provided in Appendix I.

Panel A: Alternative SEO definition; excluding small SEOs

Dependent Variable	**YRRET**	**INV_OVER**	**ACQ_CAR(-1,1)**	**ln(TOTYRPAY)**	**Δln(TOTYRPAY)**	**YRRET**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
SEO	-0.024	1.575***	-0.026*	0.122*	-0.160**	-0.351***
	(0.07)	(0.53)	(0.01)	(0.07)	(0.08)	(0.08)
SEO x ln(CAPEX)	-0.485***					
	(0.09)					
SEO x ΔROA					-78.034***	
					(29.25)	
Firm FE	Y	Y	N	Y	Y	Y
Year FE (Dummies)	Y	Y	Y	Y	Y	Y
Observations	12,282	7,193	3,764	12,790	11,957	14,362
Adjusted R-squared	0.651		0.005	0.812	0.102	0.635
Pseudo R-squared		0.058				

Panel B: Alternative SEO definition; excluding the year of SEO

Dependent Variable	**YRRET**	**INV_OVER**	**ACQ_CAR(-1,1)**	**ln(TOTYRPAY)**	**Δln(TOTYRPAY)**	**YRRET**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
SEO	-0.105	1.189**	-0.010*	0.088	-0.068	-0.422***
	(0.09)	(0.52)	(0.01)	(0.07)	(0.07)	(0.09)
SEO x ln(CAPEX)	-0.817***					
	(0.19)					
SEO x ΔROA					-17.336	
					(32.86)	
Firm FE	Y	Y	N	Y	Y	Y
Year FE (Dummies)	Y	Y	Y	Y	Y	Y
Observations	12,282	7,193	3,764	12,790	11,957	14,362
Adjusted R-squared	0.651		0.004	0.812	0.101	0.635
Pseudo R-squared		0.058				

Panel C: Include the 2008 Regulation to Construct Instruments

Dependent Variable	**YRRET**	**INV_OVER**	**ACQ_CAR(-1,1)**	**ln(TOTYRPAY)**	**Δln(TOTYRPAY)**	**YRRET**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
SEO	-0.026	1.547***	-0.026*	0.116*	-0.096	-0.347***
	(0.07)	(0.55)	(0.01)	(0.07)	(0.07)	(0.08)
SEO x ln(CAPEX)	-0.460***					
	(0.08)					
SEO x ΔROA					-38.143*	
					(19.59)	
Firm FE	Y	Y	N	Y	Y	Y
Year FE (Dummies)	Y	Y	Y	Y	Y	Y
Observations	12,282	7,193	3,764	12,790	11,957	14,362
Adjusted R-squared	0.651		0.005	0.812	0.101	0.635
Pseudo R-squared		0.059				

Panel D: Alternative Definitions of Dependent Variables

Dependent Variable	**AB_INV** **(1)**	**ACQ_CAR(-2,2)** **(2)**
SEO	0.036**	-0.029***
	(0.02)	(0.01)
Firm FE	Y	N
Year FE (Dummies)	Y	Y
Observations	14,270	3,764
Adjusted R-squared	0.070	0.005

Panel E: With Dividend Payout Ratio as an Additional Control

Dependent Variable	**YRRET** **(1)**	**INV_OVER** **(2)**	**ACQ_CAR(-1,1)** **(3)**	**ln(TOTYRPAY)** **(4)**	**Δln(TOTYRPAY)** **(5)**	**YRRET** **(6)**
SEO	-0.012	1.410***	-0.022*	0.125*	-0.117	-0.312***
	(0.07)	(0.53)	(0.01)	(0.07)	(0.07)	(0.08)
SEO x ln(CAPEX)	-0.399***					
	(0.08)					
SEO x ΔROA					-61.793**	
					(28.18)	
Firm FE	Y	Y	N	Y	Y	Y
Year FE (Dummies)	Y	Y	Y	Y	Y	Y
Observations	12,282	7,193	3,764	12,790	11,957	14,362
Adjusted R-squared	0.651		0.005	0.812	0.101	0.635
Pseudo R-squared		0.058				

Panel F: Alternative Sample Construction; Balanced Panel

Dependent Variable	**YRRET** **(1)**	**INV_OVER** **(2)**	**ACQ_CAR(-1,1)** **(3)**	**ln(TOTYRPAY)** **(4)**	**Δln(TOTYRPAY)** **(5)**	**YRRET** **(6)**
SEO	0.062	2.376***	-0.023***	0.115	-0.160	-0.142*
	(0.07)	(0.78)	(0.01)	(0.10)	(0.10)	(0.07)
SEO x ln(CAPEX)	-0.422***					
	(0.09)					
SEO x ΔROA					-82.541***	
					(30.20)	
Firm FE	Y	Y	N	Y	Y	Y
Year FE (Dummies)	Y	Y	Y	Y	Y	Y
Observations	9,409	5,596	2,819	9,391	8,581	10,520
Adjusted R-squared	0.660		0.002	0.805	0.122	0.648
Pseudo R-squared		0.064				