Earnings smoothing and the underpricing of seasoned equity offerings

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Abstract

Purpose – The purpose of this paper is to examine the impact of earnings smoothing on the underpricing of seasoned equity offerings (SEOs). It aims to investigate whether earnings smoothing can add value to firms by reducing the degree of SEO underpricing.

Design/methodology/approach – The sample of US common stock seasoned equity offerings (SEOs) by non-regulated firms during 1989-2009 was used to conduct various cross-section, univariate, and multivariate tests, using several proxies for earnings smoothing, in order to confirm the impact of earnings smoothing on the degree of SEO underpricing. Three-stage least square estimation was used to address the possible endogeneity of pricing and earnings smoothing.

Findings – Smooth earnings performance resulting from discretionary accruals is negatively related to SEO underpricing and improves earnings informativeness. Consistent with risk management and signaling theories, managers' efforts to produce smooth earning reports may add value to their firms. Based on the mean values for SEOs, such smoothing reduces underpricing by $0.33 per share offered and increases the value of the average offering by $1.65 million. Smoothed earnings also conveys information about the firms' future performance, as firms with a long historical pattern of smooth earnings prior to SEOs significantly outperform, for at least three years after the SEO, those with more volatile earnings, with respect to stock returns and operating performance.

Originality/value – The paper contributes specifically to the current literature on earnings smoothing by demonstrating that high quality firms that expect larger quantity of cash flows in the near future are more likely to actively smooth earnings via discretionary accruals before SEOs to reduce underpricing. The paper contributes generally by showing that firms can signal their quality to outside investors by showing smooth earnings over a long period of time and such firms are more likely to experience a lower degree of underpricing through SEO episodes.

Keywords Earnings, Assets, Pricing, Stock markets, Earnings smoothing, Earnings informativeness, Seasonal equity offerings, SEO underpricing

Paper type Research paper

JEL classification – G12 – Asset Pricing, G14 – Information and Market Efficiency, G24 – Investment Banking

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1. Introduction

This paper examines whether high quality firms with persistent earnings smoothing before a seasoned equity offering (SEO) can add value by reducing the offerings' underpricing. It provides new evidence on the positive relation between earnings smoothing and firm value through SEO episodes, and its support of the view that earnings smoothing via discretionary accruals improves the informativeness of future earnings. Based on the mean values for SEOs, such smoothing reduces underpricing by $0.33 per share and increases the value of the average offering by $1.65 million or 0.21 percent to the firm. This is a substantial increase in value that can be obtained from a smoothing earnings' strategy that, while relatively simple, is costly for underperforming firms. The loss in value from underperformance is consequently more than just the reduced stock price for outstanding shares. It includes a substantial opportunity loss associated with any new financing obtained from equity offerings. Managerial opportunism and information revealing hypothesis have been used in the literature to motivate earnings smoothing. Managerial opportunism motives argue that managers use accruals to exploit information asymmetry, manipulating current earnings to achieve various benefits to themselves or their firms. Information revealing motives argue that managers smooth earnings to reveal information about the firms' future prospect. Both hypotheses have received support from a number of theoretical and empirical studies.

Studies supporting the hypotheses that managers are eager to stabilize their earnings in order to meet their bonus target or protect their job include the following. Bergstresser and Philippon (2006) document that managers whose compensation packages are sensitive to company share prices are more likely to lead their companies with higher level of earnings management. Fudenberg and Tirole (1995) construct a model to explain that managers use earnings smoothing as a vehicle to secure their job positions, and a series of studies, including DeFond and Park (1997), have empirically supported this model.

Studies supporting the hypotheses that earnings smoothing can add value to firms by reducing information asymmetry include the following. Trueman and Titman (1988) provide evidence that high perceived earnings volatility increases the perceived risk of bankruptcy probability of the firms, hence its cost of external financing. Francis *et al.* (2004) examine the relation between cost of equity and seven attributes of earnings, including earnings smoothness, and find that earnings smoothness is negatively associated with cost of equity, even after accounting for cash flow volatility. Sankar and Subramanyam (2001) find that earnings smoothing can reveal managers' private information about future earnings, and conclude that there is information advantage to allowing reporting discretion when managers have private information beyond current earnings in a multi period framework. More recently, Tucker and Zarowin (2006) find that firms with earnings smoothing improve the use of current and past earnings in informing about future earnings forecasts leading to higher firm values. An implication from their results is that earnings smoothing should result in value premiums, *ceteris paribus*.

In the present paper, using a sample of more than 3,000 SEOs during the 21 year period 1989-2009, we find that smooth performance is negatively related to underpricing of SEOs, such that smoothing via discretionary accruals adds value to firms by reducing the degree of SEO underpricing, while smoothing via cash flows does not.

Our findings are consistent with the results of recent studies on the effects of smooth performance on firm value. Graham *et al.* (2005) document that corporate

managers perceived a positive market premium for lower earnings volatility, and Carter *et al.* (2006) find that the use of derivatives to stabilize earnings improves firm value. Rountree *et al.* (2008) also find, using Tobin's Q as a proxy for firm value, that cash flow volatility has negative effect on firm value. However, in contrast to our findings, they also find that earnings smoothing via accruals does not add value.

Our findings that earnings smoothing reduces the degree of SEO underpricing lead us to also investigate whether the volatility of contemporaneous discretionary accruals convey information about future earnings, and through it, the underpricing of SEOs. The information revealing hypothesis suggests that earnings smoothing improves the informativeness of past and current earnings about future earnings. We consequently investigate the implications of this relationship for SEO underpricing and post-SEO performance for both groups of firms, namely high and low quality groups, consisting of firms with high and low levels of earnings smoothing, respectively.

Using a modified version of Jones (1991) model to estimate discretionary accruals, we find that the volatility of discretionary accruals is negatively associated with SEO underpricing, whereas volatility of cash flow (over a five-year period prior to the offer date) is not related to underpricing. These results are somewhat consistent with the findings of Subramanyam (1996), which show that discretionary accrual returns are positively associated with future earnings, and convey information about firms' future prospects. Our results are robust sensitive to several proxies for earnings smoothness, different estimation techniques, or various sets of control variables. We control for possible endogeneity problem by using three stages least squares (3SLS) and a system of simultaneous equations. The results obtained from 3SLS also support our results. We also re-examine our results by using different proxies of earnings smoothing, including the ratio of standard deviation of cash flows to standard deviation of net income, and the correlation between accrual and cash flows. Our results are robust to these sensitivity tests.

We examine future stock returns and operating performance for SEO firms by calculating portfolio-matched buy-and-hold (BHAR) and cumulative (CARs) abnormal returns for six, 12, 18, and 36 months after the issuing year. The results show that firms with a higher level of earnings smoothing have higher return on asset (ROA) and earnings per share (EPS) in every year over the three years following SEOs than those with a lower level of earnings smoothing. The differences in ROA and EPS between the two groups of firms are statistically significant. The findings are consistent with our prediction that only high quality firms, which anticipate high levels of future cash flows, are able to actively engage in smooth earnings over a long period of time prior to SEOs, thereby resulting in a lower degree of SEO underpricing through the SEO episode.

The remainder of this paper is organized as follows. Section 2 provides related literature and motivation. Section 3 describes the research design and our SEO sample. Section 4 presents our empirical results around the SEO episode and Section 5 the empirical results for the post-SEO stock returns and operating performance. Section 6 presents the results from various robustness tests. Section 7 concludes the paper.

2. Related literature and motivation

Research supporting the managerial opportunism hypothesis shows that managers may smooth earnings to meet the bonus target (Healy, 1985), to protect their job (Arya *et al.*, 1998), and/or to inflate earnings before exercising stock options

(Bergstresser and Philippon, 2006). Those supporting the information revealing hypothesis show that firms smooth earnings to lower their cost of equity and risk perceptions of investors, and signal high future performance and high quality of earnings.

Theoretical models have attempted to explain why smooth earnings help reveal information about firms' future prospects. Channey and Lewis (1995) develop a model in which high quality firms convey their future earnings through smooth earnings. They show that, with asymmetric information, high quality firms inflate income in their financial reports more than low quality firms and that the former smooth earnings whereas the latter do not. In this model, high quality firms bear the cost of over reporting current period income via a tax burden to separate themselves from low quality firms, given that low quality firms are presumed unable to bear this burden. Only high quality firms can reveal information about future earnings by smoothing earnings. Ronen and Sadan (1981), using Spencer's (1973) signaling framework, also argue that high quality firms with good future prospect are more likely to smooth their earnings in order to reveal their quality. This is not to say that low quality firms may not also inflate earnings before some specific corporate events such as mergers and acquisitions, but rather that they are unable to do so over a long period of time given their poor future earnings.

Graham *et al.* (2005) found that 97 percent of CFOs surveyed prefer smoothing earnings with the belief that they lower the cost of capital and lead to more precise analyst's earnings forecasts. Tucker and Zarowin (2006) find a positive association between the degree of earnings smoothing and future stock returns, and Rountree *et al.* (2008) find that investors place higher value, measured by Tobin's Q, on firms with smoother performance.

The existing literature suggests that the market can infer firm quality based on a firm smoothing its earnings over a number of years. The present research aims to see if this prospect can payoff for these firms when they engage in SEOs. We hypothesize that managers of high quality firms with long historical smooth performance are more likely to push up the offer price to maximize proceeds from equity offerings, such that firms with smooth earnings are more likely to experience a lower degree of SEO underpricing episodes, compared with firms that do not.

The SEO underpricing literature is extensive. Corwin (2003) finds that SEOs are more underpriced for firms with high price uncertainty and bigger offer sizes. Kim and Shin (2004) find, investigating short selling and underpricing, that offer discounts are negatively related to underwriter rank and positively related to return volatility and underwriter spread. Cotter *et al.* (2004) documents that price stabilization is negatively associated with trading volume, offer price, and return variance.

More recently, Kim and Park (2005) examine the relation between earnings management by SEO firms and their offer prices. They find that SEO firms that aggressively manage earnings are also more likely to push up their offer prices and reduce the degree of underpricing. But in contrast to the present research, they do not test for the relationship between earnings smoothing and SEO underpricing. The longer term dimension of earnings smoothing suggests that it may be reasonable to believe that firms that smooth rather than manage earnings may have better longer term prospects. Therefore, we also test, beyond Kim and Park (2005), whether firms that engage in long-term earnings smoothing prior to SEOs have higher stock returns and operating performance in the three years after the SEOs, compared to those that do not or that

engage in shorter term window dressing by managing earnings (before SEOs). This additional test aims to disentangle alternative explanations of managerial opportunism versus information effectiveness for long-term earnings smoothing absent in Kim and Park (2005).

Indeed, the effects of smoothing performance on underpricing through SEO episodes have not received much attention. To our knowledge, no empirical research to date directly examines the relation between smooth performance and SEO underpricing. The objective of this paper is to fill this gap in the literature using a large sample of seasonal equity offerings from the last two decades, and provide new evidence on the determinants of SEO undepricing.

3. Sample description and methodology

3.1 Sample construction and offer date correction

The 1989-2009 sample of US common stock SEOs by non-regulated companies comes from the Securities Data Company's (SDC) New Issue Database. The sample excludes initial public offerings and issues by non-US firms, as well as utilities and financial firms. Only offerings after 1989 are considered because the 1987 SFAS No. 95 mandated that firms provide cash flow statement in their financial reports.

The initial sample consisted of 6,859 offerings, with stock prices obtained from the Center for Research in Security Prices (CRSP) and accounting variables from Compustat. For an offering to enter the final sample, it was necessary that there be at least eight quarterly accounting data points prior to the SEO, 250 prior trading days and 12 prior monthly returns, and sufficient other data to compute discretionary accruals. All sample firms were listed on the NYSE, NASDAQ, or AMEX. The methodology section explains in more detail where missing values necessary for obtaining discretionary accruals required us to eliminate firms from the sample. The sample size after these restrictions and deletions consists of 5,108 offerings.

Ritter's reputation rank for each underwriter, obtained from Jay Ritter's web site, supplements the data for our SEO sample[1]. Ritter evaluates each underwriter's reputation based on scores ranging from 0 to 9 (highest quality). We use each SEO lead manager's name as the identifier to obtain the Ritter underwriter ranking scores. The merging process reduces the SEO sample to 3,156 offerings. Then, to avoid the effects of outliers, we winsorize the first and bottom 1 percent of the distributions of all variables. The final sample size consists of 2,004 firms with 3,034 offerings.

Prior studies (Lease *et al.*, 1991; Eckbo and Masulis, 1992) show that offer dates directly obtained from the SDC database are often inappropriate for analyzing the underpricing of SEOs due to the fact that some offers take place after the close of trading. For example, Lease *et al.* (1991) investigate the time stamp from the Dow Jones News Service and find that 25 percent of offers from 1981 through 1983 take place after the close of trading. To address this issue, researchers have corrected offer dates for their analysis by applying a volume based correction method. For example, Safieddine and Wilhelm (1996) apply this method and find that 18.4 percent of offers during 1980-1991 required an offer date correction. Following their method, we adjust our sample offer date as follows: if trading volume on the day following the SDC offer date is:

- more than twice the trading volume on the SDC offer date; and
- more than twice the average daily trading volume over the previous 250 trading days, then the day following the SDC offer date is designated as the offer date.

3.2 Control variables

Prior studies document that the major determinants of SEO underpricing include the level of information asymmetry, level of uncertainty about firm value, underwriter reputation, price uncertainty, relative offer size, and conventional underwriter pricing practices (Altinkilic and Hansen, 2003; Corwin, 2003; Kim and Park, 2005). These variables also used in this paper, are defined as follows (the Appendix provides full descriptions).

Underpricing, the dependent variable in our multivariate analysis, is the closing price on the offer day (CRSP: PRC) minus the offer price, divided by the offer price. An alternative definition for our robustness tests is the closing price on the day prior to the offer minus the offer price, divided by the closing price on the day prior to the offer. Earnings smoothness, *Smooth*, is the ratio of the standard deviation of net income ([COMPUSTAT: IBQ] divided by the standard deviation of cash flows from operation (defined as [COMPUSTAT: IBQ] minus accruals [COMPUSTAT: ΔACTQ $-$ ΔCHEQ $-$ ΔLCTQ $+$ ΔDLCQ $-$ DPQ]) (both scaled by average total assets (COMPUSTAT: ATQ)). The volatility of net income is scaled by cash flow volatility in *Smooth* to measure the extent to which accruals are possibly used to smooth out the underlying volatility of the firm's operation, with higher values of this variable indicating more earnings volatility. We expect a negative coefficient for *Smooth*. The standard deviation of operating cash flows and net income are measured over 12 consecutive quarters, with a required minimum of eight quarters. Our measure of *Smooth* is similar to that used in prior research (Leuz *et al.*, 2003; Francis *et al.*, 2004; Mc Innis, 2010). Our primary measure of net income is net income before extraordinary item (COMPUSTAT: IBQ). Cash flows equal net income less accruals. Accruals are the change in current assets (COMPUSTAT: ACTQ) minus the change in cash (COMPUSTAT: CHEQ) minus the change in current liabilities (COMPUSTAT: LCTQ) plus the change in shorter term debt (COMP: DLCQ) minus depreciation (COMPUSTAT: DPQ).

Stock price uncertainty, *Volatility*, is defined as the standard deviation of stock returns (CRSP: RET) over the period of 30 trading days ending ten days prior to the offer date. Corwin (2003) finds that underpricing is associated with stock return volatility and bid-ask spread, and many studies show that higher return volatility is associated with higher levels of underpricing. We expect a positive coefficient for *Volatility*.

The effect of pre-offer price run up is controlled with the variable *PreCar*, calculated as the cumulative adjusted return over the period of five trading days prior to the offer. Loughran and Ritter (2002) show that equity issuers are more tolerant of excessive underpricing if they simultaneously learn about a post market valuation that is higher than what they expected. This suggests that issuers do not need much bargaining effort in their negotiations over the offer price with their contracted underwriters if they see the greater recent increase in their stock price. This also implies that pre-offer abnormal stock returns are positively related to the magnitude of the SEO underpricing. Thus, we expect a positive coefficient for *PreCar*. We follow Corwin (2003) to control for the effects of price pressure with the variable *Offersize,* calculated as shares offered divided by the total number of shares outstanding prior to the offer. Consistent with prior studies, we expect *Offersize* to be positively related to underpricing.

Prior studies also find that conventional underwriter pricing practice may have an important effect on SEO underpricing. Mola and Loughran (2004) find that SEOs are clustered at integers and do not tend to fall on odd eight fractions. Harris (1991) and Ball *et al.* (1985) argue that rounded prices may reflect underwriter desire to reduce the costs of negotiating the offer price and uncertainty about the underlying

security's value. Such rounding practices may reflect the imprecise nature of the pricing process. Therefore, we include the control variable, *Tick*, which is a dummy variable equal to one if the decimal portion of the closing price on the day prior to the offer is less than \$0.25, and zero otherwise. We also add the incremental variable *Ln(price)* and the interaction term, *Ln (price)* ***Tick* to our base regression model. Based on Corwin (2003), the sign of coefficients on *Ln (price)* ***Tick* and *Ln (price)* are expected to be negative and positive, respectively.

Previous studies document that NASDAQ issues are more underpriced than NYSE issues (Ritter and Welch, 2002) because of difference in trading practices. The dummy variable *Nasdaq*, equal to one if the issuer was listed on NASDAQ, and zero if on NYSE or AMEX at the time of offer, controls for this effect. We also include the variable *IPOUnderpricing* in our regressions, measured as the average underpricing across all IPOs during the same month as the SEO, where the monthly IPO underpricing estimates are obtained from Jay Ritter's web site.

The effect of underwriter reputation on SEO underpricing is measured by the lead underwriter's ranking, also obtained from Jay Ritter's web site. Ritter refines Carter and Manaster's (1990) ranking method to construct a new ranking database for major underwriters, with rankings based on a 0-9 scale, from 1.0 to 9.0. Our final control variables are the firm's risk (*Beta*), firm's size (*Size*, log of market value of equity ([CRSP: CHSO] multiplied by [CRSP: PRC]), and book to market (*BM*, log of the ratio of book value of equity (COMPUSTAT: CEQQ) to *Size*). We calculate beta from the regression of a firms' monthly raw returns on the monthly value-weighted market returns over the rolling five-year window ending in the current fiscal year of the offer date (the Appendix provides full descriptions of all control variables in our regressions).

3.3 Descriptive statistics

Table I summarizes the characteristics of our sample SEOs. Table I, panel A presents the descriptive statistics for the sample firms. Our sample firms have a \$632.76 million mean value of assets and \$750.2 million mean equity market value. The average offering proceeds for the whole sample is \$126.8 million. On average, our sample's ROA ratio is −0.0086 (median of 0.007) and EPS is 0.037 (median of 0.06). The mean and median of market to book ratio is 0.49 and 0.36, respectively.

Table I, panel B presents the descriptive statistic for selected variables for the full SEO sample during the entire 1989-2009 period. We define underpricing as the closing price on the offer day minus the offer price, divided by the offer price[2]. The mean (median) value of the underpricing variable is 0.027 (0.013), which is statistically significant. The average underpricing is equal to 2.7 percent of the offer price for the sample period. The mean and median net income volatility is significantly lower than cash flow volatility. The mean (median) net income volatility is 0.035 (0.018) versus 0.062 (0.046) for cash flow volatility. Recall that given our definition of *Smooth*, the higher value of net income volatility relative to cash flow volatility, the lower the level of smoothing. The mean and median values of *Smooth* are 0.540 and 0.459, respectively. Stock return volatility during a 30 day period ending 11 days before the offer date is 0.033. A typical sample offer size is relatively large. The mean (median) of the relative offer size, calculated as the ratio of the number of offered shares to the total shares outstanding prior to the offer, is 0.249 (median of 0.18) or about 25 percent of shares outstanding.

Table I.
Summary statistics

Variable	*Mean*	*Std*	*25 percent*	*Median*	*75 percent*	
Panel A: descriptive statistics on sample firms ($n = 2{,}004$ firms)						
Total Assets (M$)	632.76	2,520	27.87	82.23	325.0	
Equity Market Value (M$)	750.2	3,663	43.33	122.7	378.9	
Return on Assets (*ROA*)	−0.008	0.101	−0.016	0.007	0.021	
Firm specific risk (*Beta*)	1.397	1.081	0.781	1.281	1.91	
Earnings per share (*EPS*)	0.037	3.00	−0.100	0.063	0.241	
Book to market (*BM*)	0.491	0.537	0.231	0.366	0.582	
Panel B: descriptive statistics on sample SEOs ($n = 3{,}034$ SEOs)						
SEO Underpricing (*Underpricing*)	0.027	0.045	0.000	0.013	0.049	
IPO Underpricing (*IPOunderpricing*)	0.195	0.193	0.097	0.149	0.202	
Offer proceeds (mil.)	126.8	209.5	35.00	67.40	132.0	
Relative offer size (%) (*Offersize*)	0.249	0.343	0.112	0.180	0.287	
Smoothness (*Smooth*)	0.540	0.356	0.239	0.459	0.811	
Volatility of net income (SD)	0.035	0.068	0.009	0.018	0.040	
Volatility of cash flow (SD)	0.062	0.072	0.029	0.046	0.075	
Volatility of returns (*Volatility*)	0.033	0.017	0.021	0.029	0.040	
	NASDAQ ($n = 1{,}785$)		*NYSE and AMEX ($n = 1{,}249$)*		*t-test*	
Variable	*Mean*	*Median*	*Mean*	*Median*	*t-statistics*	*p-value*
Panel C: descriptive statistics for SEOs across markets ($n = 3{,}034$ SEOs)						
SEO Underpricing (*Underpricing*)	0.0348	0.0225	0.0184	0.0071	−10.48	0.000
IPO Underpricing (*IPOunderpricing*)	0.2036	0.1497	0.1794	0.2347	−3.48	0.000
Relative offer size (%) (*Offersize*)	0.2585	0.1971	0.2347	0.1563	−1.74	0.081
Return on Assets (*ROA*)	−0.0164	0.0026	0.0043	0.0104	6.64	0.000
Volatility of net income (SD)	0.0447	0.0247	0.0217	0.0128	−10.60	0.000
Volatility of cash flow (SD)	0.0718	0.0526	0.0499	0.0368	−8.98	0.000
Volatility of returns (*Volatility*)	0.0385	0.0343	0.0252	0.0228	−23.41	0.000

Notes: This table presents descriptive statistics for our sample of firms and our sample of SEOs; the sample contains all SEO firms with available annual and quarterly data and matching data on CRSP during 1989-2009; the final sample consists of 2,004 firms with a total of 3,034 SEOs during 1989-2009; *Underpricing* is defined as the closing price on the offer day minus the offer price, divided by the offer price; *Accrual Volatility* is the standard deviation of quarterly accruals over the five-year period prior to the offer; *Book-to-market (BM)* is the natural log of the ratio of book value of equity to market value of equity; cash flow equals net income minus accruals; *Cash flow volatility* is the standard deviation of quarterly cash flows over the five-year period prior to the offer; *Net income volatility* is the standard deviation of quarterly net income over the five-year period prior to the offer date; *ROA* is the income before extraordinary items divided by average total assets; *IPOunderpricing* is the average underpricing across all IPOs during the same month as the SEO, where the monthly underpricing estimates for IPOs are obtained from Jay Ritter's web site; *Offersize* is calculated as the total shares offered divided by the total number of shares outstanding prior to the offer; net income is net income before extra ordinary items; *Smooth* is the ratio of standard deviation of net income (scaled by average total assets) divided by the standard deviation of cash flows from operation (scaled by average total assets); all variables are described in the Appendix

Table I, panel C reports the offers' characteristics across exchange markets. Consistent with prior research, the degree of underpricing for NASDAQ offers is higher than NYSE and AMEX offers. The mean (median) for SEO underpricing is 0.034 (0.022) for NASDAQ and 0.018 (0.007) for NYSE and AMEX offers, with the mean differences statistically significant (t-value equal to -10.48). This is also the case for the volatility of cash flow and of net income. Generally, NASDAQ offers have higher levels of return volatility, net income volatility, and cash flow volatility than other exchange markets.

Table II reports Pearson correlations among the control variables to show whether the correlations are generally consistent with our predictions. Our main variable of interest, *Smooth*, where low values of *Smooth* indicate higher smoothing, appears to be significantly positively associated with the level of SEO underpricing ($\rho = 0.094$, $p < 0.01$). It appears that higher smoothing via accruals is associated with a lower levels of SEO underpricing, or *Underpricing* tends to be larger the greater the degree of earnings volatility.

We find no significant correlation between *Underpricing* and *Firmsize* suggesting that firm's size, on average, is not associated with the level of underpricing. However, relative offer size (*Offersize*) and volatility of returns (*Volatility)* are positively associated with *Underpricing* ($\rho = 0.029, p < 0.01$ and $\rho = 0.166, p < 0.01$), possibly reflecting the effects of price pressure on SEO underpricing. We also find, consistent with earlier findings, that high reputation of underwriters is negatively related to the level of underpricing (-0.153), and that higher pre-offer price run-ups are positively related to the level of underpricing. The correlations generally support our prediction that firms with smooth earnings are more likely to experience a lower degree of SEO underpricing.

4. Empirical results around the SEO episode

4.1 Univariate test

Table III presents the univariate tests results of the relation between earnings volatility and SEO underpricing for quintiles of earnings smoothness (panel A) or underpricing (panel B) in our sample, including t-statistics and p-values. Table III, panel A shows that

	Smooth	PreCAR	Beta	Underpricing	Rank	BM	Volatility	Firmsize	Offersize
Smooth	1								
PreCAR	−0.039	1							
	(0.029)								
Beta	0.184	−0.004	1						
	(0.001)	(0.800)							
Underpricing	0.094	0.437	0.060	1					
	(0.000)	(0.000)	(0.000)						
Rank	−0.052	−0.004	0.013	−0.153	1				
	(0.003)	(0.808)	(0.442)	(0.000)					
Volatility	0.230	−0.088	0.308	0.173	−0.198	1			
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)				
BM	−0.130	0.008	−0.202	−0.021	−0.043	−0.132	1		
	(0.000)	(0.632)	(0.000)	(0.237)	(0.018)	(0.000)			
Firmsize	0.017	0.035	−0.011	−0.130	0.496	−0.291	−0.246	1	
	(0.329)	(0.051)	(0.532)	(0.000)	(0.000)	(0.000)	(0.000)		
Offersize	−0.051	−0.125	−0.063	0.114	−0.239	0.174	0.166	0.457	1
	(0.004)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

Table II.
Spearman correlation

Table III.
Univariate analysis

Panel A: quintiles based on *Smooth*							
	Underpricing	*PreCar*	*β*	*Volatility*	*BM*	*Rank*	*IPOUnderpricing*
Low	0.0212	−0.017	1.272	0.2830	0.527	8.126	0.177
2	0.0230	−0.023	1.247	0.0296	0.502	8.032	0.184
3	0.0252	−0.026	1.243	0.0316	0.519	7.992	0.197
4	0.0333	−0.027	1.554	0.0368	0.493	7.885	0.214
High	0.0343	−0.034	1.846	0.0391	0.433	7.879	0.201
Difference (low-high)	−0.0131***	0.017**	−0.574***	−0.010***	0.094***	0.152**	−0.024**
p-value	(0.000)	(0.018)	(0.000)	(0.000)	(0.000)	(0.046)	(0.018)
	ROA	*EPS1*	*EPS2*	*EPSOP*	*Assets*		
Low	0.0162	0.2057	0.2031	0.2114	458.94		
2	0.0125	0.1458	0.1567	0.1805	886.91		
3	0.0032	0.0961	0.1089	0.1213	941.58		
4	−0.0248	−0.2010	−0.2055	−0.0553	714.68		
High	−0.0463	−0.0487	−0.0565	−0.1282	713.04		
Difference (low-high)	0.0625	0.2544	0.2596	0.3396	−254.1		
p-value	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)		
Panel B: quintiles based on *Underpricing*							
	Smooth	*PreCar*	*Beta*	*Volatility*	*BM*	*Rank*	*IPOUnderpricing*
Low	0.5004	−0.0753	1.3990	0.0301	0.4932	8.2345	0.2012
2	0.5061	−0.0534	1.3720	0.0306	0.5138	8.1385	0.1960
3	0.5191	−0.0368	1.3968	0.0308	0.4975	8.1590	0.1825
4	0.5256	−0.0024	1.3577	0.0322	0.4914	7.8737	0.1814
High	0.6173	−0.0335	1.5116	0.0403	0.4805	7.5121	0.2143
Difference (low-high)	−0.1169***	−0.0418***	−0.1126**	−0.0102***	0.0127	0.7224***	−0.0130
p-value	(0.000)	(0.000)	(0.055)	(0.000)	(0.720)	(0.000)	(0.283)

Notes: Significant at: *10, **5, and ***1 percent levels, respectively; this table presents univariate results; we group SEOs into quintiles based on their *Underpricing* and *Smooth*; panel A reports mean of *Underpricing* and other independent variables for earning smooth quintiles arranged from low to high; the difference in means of independent variables between the low and high quintiles is shown at the bottom of the table along with the associated *p*-values in parentheses; panel B presents results sorting on *Underpricing* quintiles; all variables are described in the Appendix

both mean and median levels of SEO underpricing increase monotonically across earnings smoothness quintiles, with significant differences in the level of underpricing between firms with low versus high levels of earnings smoothing. Firms that smooth earnings heavily differ systematically from firms that smooth little or none at all. The mean of *Underpricing* in the lowest *Smooth* quintile are 0.0212, compared to 0.0343 in the highest quintiles, with the difference statistically significant at 1 percent (p-value <0.000). An average firm in the highest quintile of earnings smoothness may reduce underpricing by \$0.33, which based on the average offerings per firm results in an increased value of \$1.65 million, or 0.21 percent of firm value. This is a substantial increase in value that can be obtained from a smoothing earnings' strategy that, while relatively simple, is costly for underperforming firms to emulate. In addition, the univariate results show visible systematic patterns between *Smooth* quintiles and ROA and EPS, respectively. A close examination of panel A reveals that there is a strong monotonic relation between level of earnings smoothing and ROA and EPS before SEOs. For example, the average ROA and EPS of firms in the highest level of earning smoothness quintile (lowest quintile of *Smooth*) are 0.016 and 0.211, respectively. These averages for firms in the lowest level of earnings smoothing (highest quintile of *Smooth*) are -0.046 and -0.128, respectively. The differences in the means (median) of ROA and EPS between the two bottom and two top *Smooth* quintiles are statically significant at 1 percent level. Also, consistent with prior studies, variable *Rank* (*PreCar*) declines (increases) monotonically across earnings smoothness quintiles.

Table III, panel B shows results that are quantitatively similar to those in Table III, panel A, as panel B also shows that there is a statistically significant difference in earnings smoothness between the lowest and the highest underpricing quintiles. Our univariate tests demonstrate a strong negative relation between earnings smoothness and SEO underpricing, and support our hypothesis that SEOs from firms with smooth performance are relatively less underpriced.

4.2 Multivariate tests

The dependent variable is *Underpricing*, and the independent variable of interest is *Smooth* in the ordinary least squares regression results presented in this section. Our control variables for other factors widely accepted in the literature on the underpricing of SEOs s are:

- firm risk (*Beta*);
- market to book (*BM*, using the ratio of the book value of total equity divided by the market value of total equity;
- cumulative market adjusted returns prior to the offer date (*PreCar*);
- IPO underpricing (*IPO Underpricing*);
- return volatility (*Volatility*);
- firm size (*Size*, the log of market equity);
- relative offer size (*Offersize)*; underwriter's rank (*Rank*);
- *Tick*;
- *Ln(price)*; and
- the interaction term between *Tick* and *Ln(price)* (*Tick *Ln (price)*).

We also use dummy variables (*Nasdaq*) to control for conventional pricing practices and the different characteristics of stock exchanges. Our regression takes the following general form:

$$\begin{aligned} Underpricing = {} & \alpha_0 + \alpha_1 Smooth + \alpha_2 Beta + \alpha_3 BM + \alpha_4 PreCar \\ & + \alpha_5 IPOunderpricing + \alpha_6 Volatility + \alpha_7 Size + \alpha_8 Offersize \\ & + \alpha_9 Rank + \alpha_{10} Tick + \alpha_{11} Ln(price) + \alpha_{12} Tick{*}Ln(Price) \\ & + \alpha_{13} Nasdaq + \varepsilon, \end{aligned} \tag{1}$$

Table IV presents the results for various specifications of this general regression, such that the control variables are added in sequence to a standard set of determinants of the

Dependent variable: *Underpricing* Model	(1)	(2)	(3)	(4)	(5)
Intercept	0.0472***	0.0473***	0.0473***	0.0620***	0.0604***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Smooth	0.0080***	0.0077***	0.0078***	0.0050**	0.0050**
	(0.000)	(0.000)	(0.000)	(0.018)	(0.019)
Beta	0.0004		−0.0002	−0.0006	−0.0006
	(0.650)		(0.792)	(0.4378)	(0.446)
BM		−0.0019*	−0.0019**	−0.0018**	−0.0017*
		(0.068)	(0.035)	(0.049)	(0.051)
PreCar	0.1655***	0.1921***	0.1921***	0.2002***	0.2002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
IPOUnderpricing	−0.0047	−0.0060	−0.0060	0.0013	0.0013
	(0.267)	(0.171)	(0.169)	(0.761)	(0.759)
Volatility	0.4596***	0.4626***	0.4652***	0.4329***	0.4340***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size	−0.0008	−0.0010*	−0.0010*	−0.0003	−0.0003
	(0.106)	(0.056)	(0.058)	(0.555)	(0.573)
Offersize	0.0064***	0.0070***	0.0070***	0.0052**	0.0052**
	(0.009)	(0.002)	(0.002)	(0.014)	(0.014)
Rank	−0.0044***	−0.0044***	−0.0044***	−0.0032***	−0.0032***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Tick				0.0001	0.0063
				(0.917)	(0.452)
Ln(price)				−0.0084***	−0.0078***
				(0.000)	(0.000)
Ln(price) *Tick					−0.0020
					(0.431)
Nasdaq	0.0063***	0.0062***	0.0063***	0.0069***	0.0068***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Adj. R^2	0.235	0.271	0.271	0.282	0.282

Notes: Significant at: *10, **5, and ***1 percent levels, respectively; the results shown in this table are based on the regressions using the ratio of standard deviation of net income to standard deviation of cash flow as a proxy for earnings smoothness; the table lists coefficients (*p*-values) from OLS regressions of underpricing on *Smooth*, defined as the ratio of standard deviation of net income to the standard deviation of cash flow, and a set of control variables; *p*-values are based on White's heteroskedasticity consistent standard errors; all variables are described in the Appendix

Table IV.
Multivariate analysis

SEO underpricing. The p-values shown in the table are based on White's heteroskedasticity consistent standard errors.

The results support our hypotheses and consistent with its information role. The degree of SEO underpricing is negatively associated with earnings smoothness, with *Smooth* coefficient estimates ranging from 0.005 to 0.008 (p-value < 0.000) across the five models. All regression specifications have high explanatory power (adjusted R^2 range from 0.24 to 0.28 and F-statistics are significant at 1 percent). The highly significant *Smooth* coefficients suggest that smooth performance improves information about future earnings, thereby leading to a lower degree of the SEO underpricing.

The coefficients of other control variables are also consistent with our expectations. For example, coefficient estimates on *PreCar, Offersize, Rank*, and *Nasdaq* are of the expected sign and statistically significant at conventional levels. In models 3, 4, and 5 (full model), we sequentially add *Tick, Ln (price)* and the interaction term *Tick *Ln(price)* to the base model, with consistent results between these models and models 1 and 2. All coefficients for *Smooth* are positively related to the degree of underpricing, and other coefficient estimates are of predicted signs.

The coefficient on relative offer size (*Offersize*), with a magnitude of between 0.0052 and 0.007, is negative and significant at conventional levels in all model specifications, supporting the existence of price pressure effects on the degree of SEO underpricing. The coefficients on *BM* across all models are negative and statistically significant. This implies that high book-to-market firms experience a lower degree of SEO underpricing than low book-to-market firms. The coefficients on *Beta*, ranging from -0.0006 to 0.0004, are not statistically significant, suggesting that firm beta does not impact SEO underpricing. The coefficients of underwriter's rank, ranging from -0.0044 to -0.0032, are significant at the 1 percent level in all specifications, suggesting that underwriter's reputation plays an important role in reducing the level of underpricing. The coefficients on *Tick* < 0.25 are consistently positive, suggesting that offers are more underpriced when the previous days' closing price does not fall on an even dollar amount or \$0.25 price increment. The results support the hypothesis that pricing practice is an important factor affecting the level of SEO underpricing. In model 5, the coefficient on *PreCar* is 0.2 (p-value < 0.001), suggesting that large positive pre-offer returns lead to more underpricing. Unlike prior studies (Corwin, 2003; Kim and Park, 2005), the coefficients on *IPO Underpricing* are not statistically significant in our models, implying that SEO underpricing is not related to IPO underpricing. In addition, the coefficients on dummy variable *Nasdaq* are significantly positive, showing that firms listed on NASDAQ have a greater degree of underpricing.

4.3 3SLS estimation results

Possibly, the results may be biased if earnings smoothing, pre-offer stock returns, and SEO underpricing are jointly and endogenously determined. To address this problem, we examine the relationship between SEO underpricing and earnings smoothness by estimating the following system of simultaneous equations using 3SLS in the spirit of Kim and Park (2005)[3]:

$$\begin{aligned} Underpricing = {} & \alpha_0 + \alpha_1 Smooth + \alpha_2 DA + \alpha_3 PreCar + \alpha_4 Volatility \\ & + \alpha_5 IPOunderpricing + \alpha_6 Offersize + \alpha_7 BM + \alpha_8 Rank \\ & + \alpha_9 Tick + \alpha_{10} Lnprc + \alpha_{11} Lnprc\_tick + \alpha_{12} Nasdaq + \varepsilon, \end{aligned} \quad (2)$$

$$Smooth = \alpha_0 + \alpha_1 Underpricing + \alpha_2 DA + \alpha_3 PreCar + \alpha_4 Offersize + \alpha_5 BM + \alpha_6 Total\_accrual + \alpha_7 Size + \varepsilon, \quad (3)$$

$$PreCar = \alpha_0 + \alpha_1 Underpricing + \alpha_2 DA + \alpha_3 Volatility + \alpha_4 BM + \alpha_5 Rank + \alpha_6 Size + \alpha_7 Beta + \alpha_8 Nasdaq + \varepsilon, \quad (4)$$

We anticipate the following signs in this system. Prior studies (Schipper, 1989a, b; Bethel and Krigman, 2009) show that the likelihood that managers of SEO firms engage in earnings management is higher the greater the level of information asymmetry. It follows that the higher the stock volatility prior to an SEO, the higher the SEO underpricing. Outside investors discount the share prices of firms with high levels of information asymmetry knowing that their managers are more likely to engage in window dressing prior to equity offerings. We expect a positive sign for the coefficient on *Volatility* in equation (2).

Low quality firms that intensively use discretionary accrurals to inflate share prices prior to SEOs experience a high level of SEO underpricing, as such opportunistic behavior is more likely to be detected by outside investors or high quality auditors. Thus, the level of discretionary accruals is positively associated with SEO underpricing, such that we expect a positive sign for the coefficient on *DA* in equation (2).

Our argument that only high quality firms are able to smooth earnings over a long period of time before equity offerings to reduce underpricing suggests that the sign of the coefficient for *Smooth* in equation (2) is positive (the higher value of *Smooth*, the higher the earnings volatility). Corwin (2003) also shows that underpricing is positively related to large abnormal returns over the days prior to an SEO, such that we expect a positive coefficient on *PreCar* in equation (2).

If high quality firms can smooth earnings over a long period of time, then such firms are also more likely to experience larger pre-offer abnormal stock returns, suggesting a negative coefficient on *PreCar* in equation (3). If earnings smoothing conveys managers' private information about future earnings, then the coefficient on *Underpricing* in equation (3) should be positive, as firms with high levels of earnings smoothing prior to SEOs are more likely to experience a lower level of underpricing.

Finally, Gerard and Nanda (1993) find that pre-offer returns may reflect trading manipulation where managers may intentionally depress the stock price to exploit outside investors for the benefit of current shareholders through short selling around the SEO offer date. They provide evidence that a high level of short selling around SEOs is positively associated with a high level of issue discounts, suggesting a negative coefficient on *Underpricing* in equation (4).

We measure discretionary accruals for year t as the residuals from the following cross-section version of Jones model, modified by Kothari *et al.* (2005):

$$Accrual = \alpha_0(1/Asset_{t-1}) + \alpha_1 * \Delta Sale_t + \alpha_2 PPE_t + \alpha_3 ROA + \mu_t, \quad (5)$$

The total accrual ($Accrua_l$); change in sales ($\Delta Sale_t$); and gross property, plant, and equipment (*PPE*) are deflated by the average total assets (*Assets*) in this regression. The control variable *ROA* is added to the Jones model to account for the effect of firm performance because prior studies (Dechow *et al.*, 1995; Kothari *et al.*, 2005) find that the Jones model is misspecified for well performing or poorly performing firms. We estimate

equation (5) by two-digit SIC code and fiscal year, and then obtain a firm's year t discretionary accruals by using the residuals from the estimated regression. In order to distinguish the effects of short-term earnings management (managerial opportunism) from long-term earnings smoothing (information informativeness) on SEO underpricing, we use the total discretionary accruals over one year prior to the offer date (*DA*), along with the *Smooth* variable in the 3SLS.

The results in Table V show that the coefficient on *Smooth* in equation (2) is significantly positive (0.0335, p-value < 0.002), such that earnings smoothness is negatively associated with the degree of SEO underpricing, even after controlling for endogeneity via 3SLS. The *DA* coefficient in equation (2) is also significantly positive (0.0106, p-value < 0.05). The significant coefficient on *DA* suggests that earnings management via discretionary accruals one year prior to the SEO has a significant effect on SEO underpricing, consistent with prior studies (Kim and Park, 2005). As predicted, the coefficient on *PreCar* in equation (2) is positive and statistically significant (0.4245, p-value < 0.001). This suggests that the existence of abnormal stock returns prior to the offer date also plays a significant role in the underpricing of an SEO (after controlling for endogeneity). Consistent with our prediction, the coefficient for *Volatility* is significantly positive in equation (2), with a magnitude of 0.4410, suggesting that higher level of information asymmetry leads to a higher degree of SEO underpricing. The results in Table V also show that the coefficients of *DA and Total_accrual* in equation (3) are statistically significant, with a magnitude of -0.3175 (p-value < 0.000) and -0.0013 (p-value < 0.086), respectively, implying that firms do smooth earnings via discretionary accruals. This also suggests that SEO firms are more likely to intensively use discretionary accruals in the year prior to equity offerings. Consistent with our prediction based on Gerard and Nanda's (1993) manipulative trading hypothesis, the coefficient on *Underpricing* in equation (4) is statistically significantly negative (5.0641, p-value < 0.001). This suggests that insiders may manipulate share prices through short selling activity, thereby leading to a lower level of pre-SEO returns. Overall, we find clear evidence that earnings smoothness results in a lower degree of SEO underpricing, even after controlling for possible endogeneity.

4.4 Cash flow volatility versus accrual volatility

Thus, far, we have shown that earnings smoothness is negatively associated with SEO underpricing, and more consistent with the information revealing than the information garbling hypothesis. The former suggests that managerial discretion could enhance earnings' informativeness through communication of private information (Watts and Zimmerman, 1986; Healy and Palepu, 1993; Subramanyam, 1996). Previous research also shows that accruals, on average, have incremental information content above that provided by cash flow (Bowen *et al.*, 1987; Dechow, 1994). In this section, we examine whether cash flow volatility or accrual volatility has more pronounced effects on SEO underpricing, and how each of these incrementally contribute to the relationship between earnings smoothing and SEO underpricing. We decompose earnings volatility following Rountree *et al.* (2008) into cash flow volatility and accrual volatility, such that:

$$\delta^2_{Earnings} = \delta^2_{Cash\ \ flows} + \delta^2_{Accruals} + 2Cov(Cash\ \ flows, Accruals)$$

where accruals are constructed as earnings less cash flows as described in the Appendix.

	Underpricing (2)	Smooth (3)	PreCar (4)
Intercept	−0.3885**	3.4370***	1.2506***
	(0.0027)	(0.000)	(0.000)
Underpricing		6.1709***	−5.0641***
		(0.000)	(0.0011)
Smooth	0.0335***		
	(0.0020)		
DA	0.0106**	−0.3175***	−0.0102
	(0.0384)	(0.000)	(0.4610)
PreCar	0.4245***	−3.1818***	
	(0.001)	(0.000)	
Volatility	0.4410***		1.0754
	(0.000)		(0.1086)
IPOunderpricing	0.0045		
	(0.1237)		
Offersize	0.0363***	−0.3795	
	(0.000)	(0.000)	
BM	−0.0012	0.0096	−0.0015
	(0.1579)	(0.3285)	(0.8023)
Rank	−0.0015**		−0.0230***
	(0.0497)		(0.0045)
Total_accrual		−0.0013*	
		(0.0869)	
Tick	0.0064*		
	(0.0664)		
Lnprc	−0.0107***		
	(0.0003)		
Lnprc_tick	−0.0015		
	(0.1712)		
Size		0.0202***	−0.0045
		(0.000)	(0.1853)
Beta			0.0087
			(0.1206)
Nasdaq	0.0057***		0.0334**
	(0.000)		(0.0239)
System adj. R^2	0.1786	Basmann's (1960) test ($F = 1.53$ p-value > 0.2168)	

Notes: Significant at: *10, **5, and ***1 percent levels, respectively; this table presents results from the system of simultaneous equations as follows:

$$Underpricing = \alpha_0 + \alpha_1 Smooth + \alpha_2 DA + \alpha_3 PreCar + \alpha_4 Volatility + \alpha_5 IPOunderpricing + \alpha_6 Offersize + \alpha_7 BM + \alpha_8 Rank + \alpha_9 Tick + \alpha_{10} Lnprc + \alpha_{11} Lnprc\_tick + \alpha_{12} Nasdaq + \varepsilon, \quad (2)$$

$$Smooth = \alpha_0 + \alpha_1 Underpricing + \alpha_2 DA + \alpha_3 PreCar + \alpha_4 Offersize + \alpha_5 BM + \alpha_6 Total\_accrual + \alpha_7 Size + \varepsilon, \quad (3)$$

$$PreCar = \alpha_0 + \alpha_1 Underpricing + \alpha_2 DA + \alpha_3 Volatility + \alpha_4 BM + \alpha_5 Rank + \alpha_6 Size + \alpha_7 Beta + \alpha_8 Nasdaq + \varepsilon, \quad (4)$$

all variables are described in the Appendix

Table V.
Three-stage least squares estimation on the relation between earnings smoothing and SEO underpricing

The results in Table VI show regression estimates of *Underpricing* on earnings volatility and each of its components. The results as expected support the information revealing hypothesis, implying that *Accrual volatility* has a strong negative relation to *SEO Underpricing*. The coefficient estimate of *Accrual volatility* in model 3 is −0.0045 ($t = -1.83$), so that a negative 1 percent change in accrual volatility leads to positive 0.0045 percent change in SEO underpricing, suggesting that smooth earnings via accruals adds value. The coefficient of *Accrual volatility* is statistically significant (at 10 percent), whereas the coefficient on *Cash flow volatility* is not, suggesting that earnings smoothing via accruals reduces SEO underpricing beyond the cash flow volatility.

Overall, the results in Table VI show that earnings smoothing via accruals reveals information about the firms' future prospect, and that earnings smoothing via

Model	(1)	(2)	(3)
Intercept	0.0699***	0.0673***	0.0640***
	(0.000)	(0.000)	(0.000)
Ln (Earnings volatility)	0.0033***		0.0042***
	(0.001)		(0.002)
Ln (Accrual volatility)			−0.0045*
			(0.067)
Ln (Cashflow volatility)		0.0017	0.0026
		(0.115)	(0.311)
Correlation	−0.0020	0.0039*	−0.0067*
	(0.498)	(0.087)	(0.079)
Beta	−0.0002	−0.0001	−0.000
	(0.767)	(0.861)	(0.803)
PreCAR	0.1748***	0.1750***	0.1754***
	(0.000)	(0.000)	(0.000)
IPOUnderpricing	0.0017	0.0023	0.0018
	(0.648)	(0.547)	(0.638)
Rank	−0.0031***	−0.0032***	−0.0032***
	(0.000)	(0.000)	(0.000)
Volatility	0.4242***	0.4388***	0.4264***
	(0.000)	(0.000)	(0.000)
Offersize	0.0046**	0.0046**	0.0048**
	(0.029)	(0.033)	(0.025)
Tick	0.0096	0.0096	0.0099
	(0.163)	(0.161)	(0.149)
Ln(price)	−0.0066***	−0.0070***	−0.0066***
	(0.000)	(0.000)	(0.000)
Ln(price)*Tick	−0.0032	−0.0033	−0.0034
	(0.140)	(0.1374)	(0.1257)
Nasdaq	0.0063***	0.0067***	0.006***
	(0.000)	(0.000)	(0.000)
System adj. R^2	0.244	0.246	0.247

Notes: Significant at: *10, **5, and ***1 percent levels, respectively; this table presents results from cross-sectional regressions of the *Underpricing* on each components of earnings volatility; the components of earnings volatility include accrual volatility, cash flow volatility, and the correlation of cash flows and accruals; all regressions include control variables that are described in the Appendix; *p*-values are reported beneath the coefficient estimates in parentheses; all variables are described in the Appendix

Table VI.
SEO underpricing and components of earnings volatility

discretionary accruals over a number of years prior to the offer date leads to a lower level of SEO underpricing.

5. Empirical results on post-SEO market returns and operating performance

5.1 Post-SEO stock returns performance

We hypothesize that firms with high levels of earnings smoothing over long periods of time before SEOs have higher stock returns after SEOs, compared to firms with low levels of earnings smoothing, given that high quality firms with high anticipated future cash flows are more likely to actively engage in earnings smoothing prior to SEOs. We use multiple approaches widely used in the literature to calculate abnormal stock returns for both groups of firms over six-months, and one-, two- and three-year periods following SEOs, and *t*-tests to examine for significant differences.

Specifically, we calculate for post-SEO periods (six, 12, 24, and 36 months) portfolio matched buy and hold abnormal returns (BHARs) and cumulative abnormal returns (CARs), such that:

$$BHAR_i = \prod_{t=1}^{T}(1 + R_{it}) - \prod_{t=1}^{T}(1 + R_{Benchmark,t}),$$

where the mean is the weighted average of the firm's BHARs, or:

$$\overline{BHAR} = \sum_{i=1}^{N} w_i \cdot BHAR_i$$

and:

$$CAR_i = \sum_{t=1}^{T}(R_{it} - R_{Benchmark,t})$$

where $R_{Benchmark,t}$ is the returns on corresponding value-weighted size/book to market (BM) portfolio constructed by Fama and French (1993).

We apply the same portfolio matching procedure to calculate BHAR and CAR for each firm. Two sub-samples from our main SEO sample are created, with the high (low) quality sub-sample including only firms from the top (bottom) two *Smooth* quintiles. We match at the beginning of each offer year each firm in our two sub-samples to its corresponding portfolio out of 25 portfolios using the 5×5 size/BM breakpoints from WRDS's Fama-French dataset. Delisted firms are retained during the post-SEO windows to avoid survivorship bias by including delisting returns and investing the proceeds in the matching size/BM portfolio. Following Mitchell and Stafford (2000), we calculate the value-weighted average of the individual BHARs based on market capitalization at the event year (offer year), scaled by the level of the CRSP value-weighted weights at each point in time. This procedure avoids the issue arising from unstandardized value weights that would give more weight to the more recent observations.

Table VII provides both BHAR and CAR results over different post-SEO window horizons. Both the high and low quality sub-samples of firms – the top and bottom two *Smooth* quintiles – outperform their benchmark portfolios by 5.6-10.36 percent (depending on use of the value-weighted BHAR or CAR) during the first six months

Table VII. Post-SEO performance

		Panel A: buy-and-hold abnormal returns (BHARs)				Panel B: cumulative abnormal returns (CARs)			
		Equally weighted		*Value-weighted*		*Equally weighted*		*Value-weighted*	
Month	*Firm type*	*BHAR*	*p-value*	*BHAR*	*p-value*	*CAR*	*p-value*	*CAR*	*p-value*
6	Low quality (the top two *Smooth* quintiles)	3.2903**	0.0509	6.4170***	(0.000)	2.9918***	0.0019	5.6571***	(0.000)
	High quality (the bottom two *Smooth* quintiles)	0.3351***	0.0018	10.3634***	(0.000)	2.8705**	0.0369	8.8890***	(0.000)
	Difference (Low-High)	*2.9552****	*(0.000)*	*− 3.9466****	*(0.000)*	*0.1212****	*(0.000)*	*− 3.2319****	*(0.000)*
12	Low quality (the top two *Smooth* quintiles)	3.2961*	0.0678	2.3583	0.1644	1.5446	0.3038	−1.4150	0.3769
	High quality (the bottom two *Smooth* quintiles)	2.4327	0.5641	10.3175***	(0.000)	−3.5694	0.1438	4.9259***	0.0036
	Difference (Low-High)	*0.8635****	*(0.000)*	*− 7.9592****	*(0.000)*	*5.1130****	*(0.000)*	*− 6.3409*	*0.2863*
18	Low quality (the top two *Smooth* quintiles)	0.8775	0.6959	−2.5727	0.1817	−0.4818	0.7907	−3.514***	0.0045
	High quality (the bottom two *Smooth* quintiles)	−2.2059	0.5520	1.0437	0.7675	0.5603	0.8219	−4.228**	0.0372
	Difference (Low-High)	*3.0834****	*(0.000)*	*− 3.6164****	*(0.000)*	*− 1.0421****	*(0.000)*	*0.7147****	*(0.000)*

(*continued*)

Table VII.

36	Low quality (the top two *Smooth* quintiles)	−7.2301 *	0.0801	−6.8072 *	0.0543	−5.4059 **	0.0268	−3.9882 **	0.0480
	High quality (the bottom two *Smooth* quintiles)	17.9644 ***	0.0023	27.9135	0.2469	13.0883 **	0.0113	1.3954	0.6337
	Difference (Low-High)	*−35.194 ****	*(0.000)*	*−34.721 ****	*(0.000)*	*−18.494 ****	*(0.000)*	*−5.383 ****	*(0.000)*
	Panel C: post-SEO operating performance metrics for both groups								
		Year 0 (offer year)		*Year 1*		*Year 2*		*Year 3*	
		ROA	*EPS*	*ROA*	*EPS*	*ROA*	*EPS*	*ROA*	*EPS*
	Low quality (the top two *Smooth* quintiles)	−0.1065	−0.5296	−0.1833	−0.6472	−0.1677	−1.2972	−0.1524	−2.0509
	High quality (the bottom two *Smooth* quintiles)	0.0546	1.0069	0.0371	0.7362	0.0165	0.4016	0.0168	0.5121
	Difference (High-Low)	*0.161 ****	*1.536 ****	*0.220 ****	*1.383 ****	*0.184 ****	*1.698 ****	*0.169 ****	*2.562 ****

Notes: Significance at: *10, **5, and ***1 percent levels, respectively; this table presents post-SEO stock returns performance for two groups of firms based on levels of earnings smoothing; firms in the two bottom (top) *Smooth* quintiles are classified as high quality (low quality) groups; panel A shows the average compounded buy-and-hold abnormal returns (BHARs) for both groups over different horizons; returns are compounded over six, 12, 18, and 36 months after the offer date; each firm is matched to the corresponding size/BM portfolio, which is constructed by using Fama-French's size/BM quintile breakpoints; panel B presents cumulative abnormal returns (CARs) for high and low quality firms; all equally weighted and value-weighted average returns in the table are expressed as percentages; two sided *p*-values from conventional means tests are shown in parentheses next to coefficients; all variables are described in the Appendix

following SEOs. Not surprisingly, as well documented in the literature (Teoh *et al.* , 1998a, b; Loughran and Ritter, 1997), performance deteriorates over the first two years following SEOs, as shown in panels A and B, although the high quality sub-sample outperforms the low quality and the benchmark. For example, in the 36 month horizon, BHARs and CARs show that the high quality sub-sample outperforms the low quality by 34.72 percent (5.38 percent) on a value-weighted BHARs (CARs) basis (p-value = 0.000). The performance of the high quality sub-sample persistently increases over time, regardless of the measurement of abnormal returns used, whereas the low quality performance deteriorates after 18 months following the SEOs.

5.2 Post-SEO operating performance

We also examine, in addition to stock returns, whether the post-SEO operating performance measured by ROAs and EPS of firms with high level of earnings smoothing are higher than those with low levels. Table VII panel C shows ROA and EPS in the offer and next three post-offer years for the two sub-samples. In all post-offer years, ROA and EPS for the high (low) quality sub-samples are positive (negative), with the difference statistically significant. The differences in ROA (EPS) between the high quality and low quality sub-samples are 0.22 (1.383), 0.184 (1.698), and 0.169 (2.562) percent in the three years after the issue year, respectively.

Overall, the results for post-SEO stock returns and operating performance provide evidence that managers of low quality firms may still benefit from misleading investors through short-term earning management tactics surrounding SEOs by lowering the offer price through SEO episodes. However, the performance of such firms would deteriorate in the long run. In contrast, high quality firms that are able to smooth earnings over a long time-period prior to SEOs not only experience a lower level of SEO undepricing, but also higher long run performance. This finding supports our argument that only high quality firms that anticipate large future cash flows are able to smooth earnings over a long period of time prior to SEOs and are more likely to push up their offer prices, thereby experiencing a lower level of SEO underpricing.

6. Robustness tests

The results thus far use *Smooth* as the primary proxy for earnings smoothness. In this section, two proxies for earnings smoothness are used as robustness tests. In the first, we use the decile rank of the ratio of the standard deviation of net income to the standard deviation of cash flows.

Table VIII, column 1 shows that this new measure of earnings smoothness (the decile rank of *Smooth*) is positively associated with *Underpricing* and significant at the 1 percent level (0.0008, p-value = 0.000).

Leuz *et al.* (2003) argue that firms may use accruals to report smoother earnings and conceal economic shocks to operating cash flow. A negative correlation between accruals and cash flow, in their view, more directly measures earnings smoothing via accruals. Thus, we use this correlation as proxy for earnings smoothness as a second robustness test. Following Leuz *et al.* (2003) and Barton (2001), we use the correlation between quarterly cash flows and accruals over the five-year period prior to the offer date. The results shown in Table VII, column 2 suggest that the more negative the correlation between accruals and cash flows, the less the degree of SEO underpricing (underpricing increases as the correlation becomes more positive (less negative)).

Dependent variable: *Underpricing* Model	Model 1	Model 2
Intercept	0.0582***	0.0667***
Decile rank (*Smooth*) (model 1)	(0.000)	(0.000)
Correlation (*Cashflow*/*Accruals*) (model 2)	0.0008***	0.0052**
	(0.0014)	(0.033)
Beta	−0.0009	−0.0006
	(0.341)	(0.369)
BM	−0.0017*	−0.0019**
	(0.0903)	(0.037)
PreCar	0.2023***	0.2035***
	(0.000)	(0.000)
IPOunderpricing	0.0009	0.0011
	(0.850)	(0.761)
Volatility	0.4401***	0.4464***
	(0.000)	(0.000)
Firmsize	−0.0002	−0.0002
	(0.705)	(0.681)
Offersize	0.0051**	0.0054**
	(0.016)	(0.013)
Rank	−0.0031***	−0.0034***
	(0.000)	(0.000)
Tick	0.0068	0.0051
	(0.420)	(0.452)
Ln(price)	−0.0078***	−0.0077***
	(0.000)	(0.000)
Ln(price)*Tick	−0.0024	−0.0018
	(0.359)	(0.460)
Nasdaq	0.0066***	0.0072***
	(0.000)	(0.000)
Adj. R^2	0.281	0.289

Notes: Significant at: *10, **5, and ***1 percent levels, respectively; the results tabulated in this table are based on the regressions using the decile rank of the ratio of the standard deviation of net income to the standard deviation of cash flow (model 1), and the correlation between cash flows and accruals (model 2) as proxies for earnings smoothness; *p*-values are reported beneath the coefficient estimates in parentheses; all variables are defined in the Appendix

Table VIII.
Robustness regressions

As a final robustness test, we re-estimate our regression specifications with an alternative measure of underpricing (*Underpricing_discount*), defined as the closing price on the day prior to the offer minus the offer price, divided by the closing price on the day prior to offer. Table IX shows that our main results remain unchanged.

7. Conclusion

This study examines the relation between earnings smoothing and SEO underpricing. We argue that high quality firms that expect larger quantity of cash flows in the near future are more likely to actively manage earnings via discretionary accrual before SEOs to reduce the cost of capital and SEO underpricing. If high quality firms that are confident about future earnings actively smooth earnings, it is plausible to assume that they also push their offer prices up more aggressively.

Dependent variable: *Underpricing_discount* Model	(1)	(2)	(3)
Intercept	0.0624***	0.0620***	0.0674***
Smooth (model 1)	(0.000)	(0.000)	(0.000)
Decile rank of *Smooth* (model 2)			
Correlation (*Cashflow/Accrual*) (model 3)	0.0038**	0.0005***	0.0037**
	(0.020)	(0.004)	(0.033)
Beta	0.0008	0.0008	0.0008
	(0.146)	(0.156)	(0.154)
BM	−0.0007	−0.0007	−0.0007
	(0.286)	(0.283)	(0.288)
PreCar	0.0764***	0.0764***	0.0765***
	(0.000)	(0.000)	(0.000)
IPOunderpricing	−0.0060**	−0.0062**	−0.0056**
	(0.041)	(0.035)	(0.049)
Volatility	0.3992***	0.0396***	0.4019***
	(0.000)	(0.000)	(0.000)
Firmsize	−0.0001	−0.0001	−0.0001
	(0.717)	(0.654)	(0.7805)
Offersize	0.0026*	0.0027*	0.0026*
	(0.098)	(0.093)	(0.096)
Rank	−0.0033***	−0.0033***	−0.0034***
	(0.000)	(0.000)	(0.000)
Tick	0.0041	0.0041	0.0040
	(0.429)	(0.426)	(0.442)
Ln(price)	−0.0087***	−0.0086***	−0.0087***
	(0.000)	(0.000)	(0.000)
Ln(price)*Tick	−0.0012	−0.0012	−0.0012
	(0.446)	(0.445)	(0.457)
Nasdaq	0.0034***	0.0033**	0.0034***
	(0.009)	(0.011)	(0.009)
Adj. R^2	0.267	0.268	0.267

Notes: Significant at: *10, **5, and ***1 percent levels, respectively; this table presents results obtained from regressing *Underpricing_discount* on alternative proxies for Smoothness, plus a set of control variables; *p*-values are reported beneath the coefficient estimates in parentheses; all variables are defined in the Appendix

Table IX.
Robustness regressions

In addition, market participants who observe a firm smoothing earnings over a number of years prior to an SEO are more likely able to infer firm quality, since smoothing over a longer period is more costly for lower quality firms. Taken together, we hypothesize that firms with smooth performance over a number of years prior to the SEOs would have a lesser degree of SEO underpricing.

Our empirical results support this hypothesis, such that earnings smoothness appears to result in less SEO underpricing, based on a sample of more than 3,000 SEOs from 1989 through 2009. This relationship holds regardless of estimation techniques, earnings smoothness proxies, or measures of SEO underpricing that are used. Three-stage least squares estimation and other robustness tests also support our hypothesis, even after controlling for endogeneity problems. We also find evidence that firms with a long historical pattern of smooth earnings prior to SEOs significantly outperform on a stock returns and operating basis those with more volatile earnings in at least the three year period thereafter.

The economic significance of these results is such that smoothing reduces mean underpricing by \$0.33 per share and increases the mean offering value by \$1.65 million (about one-fifth of 1 percent of the mean offering firm's value). A substantial increase in value is possible utilizing a simple strategy that is nevertheless costly for underperforming firms, who suffer substantial opportunity losses from new equity offerings.

Notes

1. Jay Ritter web site at: http://bear.warrington.ufl.edu/ritter/ipodata.htm
2. We also use the closing price on the day prior to the offer minus the offer price, divided by the closing price on the day prior to the offer, as an alternative definition in our robustness tests.
3. Unlike Kim and Park (2005), we conduct Basman' (1960) test to check the validity of overidentifying restrictions in our 3SLS model specification. The Basman's statistics provided by the test (via SAS Proc Syslin 3SLS with option/overid) fails to reject the null hypothesis, with F-value = 1.53 and p-value > 0.2168.

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Appendix. Variable definitions

Accrual Volatility. Standard deviation of quarterly accruals over the five-year period prior to the offer. Accruals are calculated as the change in current assets minus the change in cash minus the change in current liabilities plus the change in short-term debt minus depreciation, scaled by average total assets.

Book-to-market (BM). The natural log of the ratio of book value of equity to market value of equity.

Cash flow. Net income minus accruals.

Cash flow volatility. Standard deviation of quarterly cash flows over the five-year period prior to the offer.

Correlation. The correlation between quarterly cash flows and accruals over the five-year period prior to the offer date.

DA. Total discretionary accruals over one year prior to the offer date.

EPS. Earnings per share (basic)/excluding extraordinary items.

EPS1. Earnings per share (diluted)/excluding extraordinary items.

EPSOP. Earnings per share from operations.

Beta. Computed from a regression of firms' monthly raw returns on the monthly value-weighted market returns over the rolling five-year window ending in the current fiscal year of the offer date.

Size. The natural log of market value of equity, measured at the end of fiscal year become available for the monthly regressions.

IPOunderpricing. the average underpricing across all IPOs during the same month as the SEO, where the monthly underpricing estimates for IPOs are obtained from Jay Ritter's web site. To address the effects of underwriter reputation on SEO underpricing, we obtain underwriter ranking sample jay Ritter's web site. Ritter refines Carter and Manaster's (1990) ranking method to construct a new ranking database for major underwriters and underwriters are ranked based on a 0-9 scale.

Ln(price). Natural log of the closing price on the day prior to the offer date.

Nasdaq. The dummy variable that equals one if the firms listed on the NASDAQ at the time of offer and zero otherwise.

Offersize. Shares offered divided by the total number of shares outstanding prior to the offer.

Precar. cumulative market adjusted returns over the period of five days prior to the offer date.

Returns Volatility. The standard deviation of stock returns over the period of 30 trading days ending ten days prior to the offer.

Net Income. Net income before extra ordinary items.

ROA. The income before extraordinary items divided by average total assets.

Smooth. The ratio of standard deviation of net income (scaled by average total assets) divided by the standard deviation of cash flows from operation (scaled by average total assets). We scale the volatility of net income by cash flow volatility to measure the extent to which accruals are possibly used to smooth out the underlying volatility of the firm's operation. Our primary measure of net income is net income before extraordinary item scaled by average total assets. Cash flows equal net income less accruals. Accruals are the change in current assets minus the change in cash minus the change in current liabilities plus the change in shorter debt minus depreciation.

Tick. The dummy variable taking the value 1 if the decimal portion of the closing price on the day prior to the offer is less than \$0.25, and zero otherwise.

Total_accrual. Total discretionary accruals over the five-year period prior to the offer, scaled by average total assets.

Underpricing. The closing price on the offer day minus the offer price, divided by the offer price.

Underpricing_discount. The closing price on the day prior to the offer minus the offer price, divided to the closing price on the day prior to the offer.

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