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Information spillovers around seasoned equity offerings ☆

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ABSTRACT

We examine information spillovers in the context of seasoned equity offerings (SEOs). Rival firms react significantly positively (0.26%) to primary SEO announcements, indicative of a competitive effect, but negatively (−0.35%) to secondary share announcements, which is evidence of a contagion effect. Consistent with the view that primary equity offerings signal favorable industry prospects because firms presumably issue new shares to invest in profitable projects, we find that the rival response is positively related to analysts' EPS growth forecasts. However, when insiders are selling their shares through a secondary offer, this may suggest overvaluation and thus negatively impacts rival firms. Consistent with this view, we find when VCs sell through a secondary offerings, rivals experience a more significant negative reaction. We find rival firms are more likely to follow their peers and conduct a primary SEO if the market reacts favorably to their peer's SEO announcement. Finally, rival firms outperform secondary share issuers of equity, but not primary share issuers. Collectively, the findings support the view that insiders take advantage of windows of opportunity when they sell their own shares, but not when they raise capital for investing purposes.

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1. Introduction

A recent interest in information spillovers in financial markets has spurred research in various areas such as IPOs (Benveniste et al. (2002) and Hsu et al. (2010)), mergers and acquisitions (Burns and Liebenberg (2011), Song and Walkling (2000), Funke et al. (2008), and Shahrur and Venkateswaran (2009)), repurchases (Erwin and Miller (1998) and Massa et al. (2007)), banking (Rajan (1994)), and bankruptcies (Lang and Stulz (1992), Jorion and Zhang (2007), Hertzel et al. (2008), and Boone and Ivanov (2012)). These studies investigate how the market reacts to rival firms when their peers take strategic moves, make investment decisions or when there are macroeconomic shocks like capital liquidity to the whole industry.

In the context of information spillovers, two seemingly opposite hypotheses related to information externalities have been advanced. The "contagion effect" suggests that information spillovers will be consistent across all firms in the same industry because like firms share common characteristics such as growth opportunities and similar capital structures. For instance, Jorion and Zhang (2007) show strong intra-industry contagion effects from firms that file Chapter 11 bankruptcies.

Unlike the contagion effect that suggests information spillovers will be similar across all firms, the "competitive effect" predicts the opposite effect on rivals. This hypothesis suggests that information about one firm in an industry can send a competitive signal about advantages or disadvantages that this firm has relative to its peers. Erwin and Miller (1998) document that while open market repurchase announcements have a positive effect on an event firm's equity values, they have a negative effect on rivals in the same industry. In a sample of firms filing for bankruptcy, Lang and Stulz (1992) find an overall contagion effect but a competitive effect in

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concentrated industries. That is, on the whole, a bankruptcy filing by one firm sends a negative shock to the industry, but in concentrated industries it is viewed positively because rivals are likely to take advantage of a defunct competitor.

In this paper, we examine information spillovers in a sample of seasoned equity offers.[2] Hsu et al. (2010) find that competitive advantages of IPO firms impose negative pressure on stock performance and operating performance of existing rival firms. SEO firms are not new entrants to the public markets, so information asymmetry in these firms is less severe compared to newly public firms. Nevertheless, a firm's decision to raise additional equity capital through an SEO can also impact its business partners and have implications on the overall competitiveness of the product market. Johnson et al. (2011) examine how SEO announcements could affect SEO firms' large customers. They find a negative market reaction to the large customers' of equity issuers around the SEO announcement. Our focus is on the impact of SEOs to rival firms operating within the same product markets. Specifically, we examine whether the information content of an SEO announcement impacts the stock price of rival firms. Further, we explore if rival firms strategically react to such announcements.

In our sample of 1777 firms that announce a seasoned equity offering from 1997 to 2006, we find an average announcement return of approximately −2.5% in the three days centered on the announcement date. This is consistent with previous findings. More importantly, we find a corresponding average announcement return on rival firms of approximately 0.14%, but when we split the sample based on SEO firms that issue more than 50% primary shares and those that issue more than 50% secondary shares, we find mean CARs of 0.26% and −0.35%, respectively. This indicates that primary share offers of equity elicit a competitive effect whereas secondary offers signal a contagion effect.

We investigate potential explanations for this asymmetric spillover to these two different types of equity offerings. For primary offers, we find that the rivals' response is positively related to analysts' 1-year EPS growth estimates and when the use of proceeds is for R&D purposes. This evidence is most consistent with the notion that primary equity offerings send signals of favorable industry growth prospects.

For secondary issues, we find that the market reaction to secondary offerings is more negative when venture capitalists are selling in the offer. Firms that use higher quality underwriters mitigate the negative spillover. Collectively, these results suggest that secondary offerings potentially send a negative industry overvaluation signal.

We model the probability that a rival firm follows the SEO firm by also issuing equity. Like studies examining the choice to issue equity, we find rival firms are more likely to do an SEO when their stocks perform well, when more firms in the industry participate in SEOs, and when growth options and leverage are high. Our contribution is that we find that rival firms are more likely to follow their peer's SEO when the spillover effect from that peer is non-negative. In other words, information spillovers influence decision-making at rival firms. This is consistent with Benveniste et al. (2002) who demonstrate that spillovers from IPOs influence the listing decisions of other firms in the industry.

Finally, we examine the long-run performance of rival firms after their peers' SEO announcements. We apply both the calendar time portfolio and buy-and-hold return approaches. We find that rival firms that never announce seasoned equity offerings in our sample have better long-run performance than SEO firms, but this result is only significant for secondary share issuers. Overall, our results provide some support for the windows of opportunity hypothesis (Loughran and Ritter (1995, 1997)) that suggests management issues equity when they believe their firm is overvalued. However, our evidence suggests that this only holds when insiders sell their existing shares, but not when they raise new capital.

The rest of this paper proceeds as follows. Section 2 discusses the relevant literature and introduces our hypotheses. Section 3 describes the data and provides empirical results, followed by the conclusion in Section 4.

2. Literature review and motivation

2.1. Information spillover

Many studies have examined information spillover effects in different settings. Hameed et al. (2010) argue that information spillovers exist in stock markets in general whereby information garnered from “bellwether” or highly followed stocks are used to price neglected stocks. Other studies examine spillovers surrounding corporate events. For example, Benveniste et al. (2002) and Benveniste et al. (2003) present evidence of information spillovers from one firm's IPO decision that can strongly influence other potential issuing firms since these firms share a common valuation factor. Harford (2005) reports that industry shocks account for some but not all of merger waves. Capital liquidity of the overall industry and economic conditions also play an important role in explaining merger waves.

Two kinds of effects related to intra-industry information spillover have been identified, namely a contagion effect and a competitive effect. Empirically, a contagion effect is said to exist if rival firms have a similar response to the event firm. The opposite is true for competitive effects. Some studies find evidence of a contagion effect. For example, Song and Walkling (2000) find a positive market reaction to target rivals when a peer firm is announced as an acquisition candidate. Likewise, Shahrur and Venkateswaran (2009) show that rivals experience negative abnormal returns when acquiring peers announce diversifying takeovers. Allen and Gale (2000) argue that there is a strong information contagion effect in the financial sector. If one firm in the industry suffers from liquidity constraints, other firms in the same industry are very likely to incur liquidity problems too. Finally, Slovin et al. (1992) also find evidence of spillovers in a sample of banks between 1975 and 1988. They are mostly concerned with changes in regulatory policies such as forcing banks to issue equity to maintain adequate leverage ratios. They too find evidence of contagion effects.

[2] Slovin et al. (1992) examine information spillovers in equity markets, but their paper focuses on the banking sector. In the limited analysis they do on industrial firms, they do not find evidence of spillovers.

Table 1
Summary statistics of SEOs.
This table provides summary statistics of SEO firms during 1997 to 2006. SEOSIZE is the total proceeds raised in the SEO. SEORELSIZE, the relative SEO size, is calculated as SEO proceeds divided by a firm's total assets before the offering. PRMPCT is the percentage of primary shares. INDSEOWAVE is the number of SEO announcements in the preceding six months before a firm's SEO announcement within a given industry. RELWAVE is INDSEOWAVE scaled by the number of firms within an industry. MKTSEOWAVE is the number of SEO announcements in the preceding six months before a firm's SEO announcements.

SEO announcement summary statistics												
Year	N	SEOSIZE($M)		SEORELSIZE		PRMPCT		INDSEOWAVE		RELWAVE		MKTSEOWAVE	
		Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
1997	258	94.76	56.85	0.77	0.48	69.75%	86.96%	1.66	1.00	4.42%	2.99%	105.26	120.00
1998	184	137.31	74.30	0.63	0.34	68.39%	91.63%	1.84	1.00	4.77%	3.57%	137.60	146.00
1999	204	208.94	102.15	1.05	0.42	73.95%	100.00%	2.09	1.00	4.10%	3.07%	90.89	103.50
2000	175	189.27	106.70	1.67	0.66	82.32%	100.00%	3.45	2.00	4.05%	3.01%	103.69	107.00
2001	154	176.83	105.40	0.43	0.27	74.20%	96.64%	1.90	1.00	4.47%	3.03%	74.83	79.00
2002	142	175.36	100.00	0.36	0.20	71.03%	100.00%	1.57	1.00	6.18%	3.85%	91.01	92.00
2003	194	151.14	92.75	0.59	0.33	70.69%	100.00%	2.65	1.00	4.40%	3.13%	86.16	89.00
2004	178	139.59	81.15	0.50	0.25	62.26%	94.71%	2.60	1.00	5.00%	3.39%	119.24	131.00
2005	134	278.26	102.15	0.60	0.34	65.49%	100.00%	2.10	1.00	5.09%	3.54%	67.60	67.00
2006	154	192.69	104.20	0.58	0.35	62.42%	100.00%	2.12	1.00	5.15%	2.63%	81.32	81.00
97-06	1777	168.10	87.60	0.74	0.35	70.21%	99.25%	2.19	1.00	4.70%	3.16%	97.42	95.00

While several papers find evidence of contagion, perhaps just as many find competitive effects. Hsu et al. (2010) find negative market reactions to industry rivals when a private firm announces its intentions to go public. In a related paper, Hsu et al. (2010) find competitive effects when companies receive private equity financing. They show rival firms' stock prices decline when announcements of a private equity investment are made in their industry and positive reactions to announcements of private equity withdrawals. Erwin and Miller (1998) also document competitive effects to industry rivals when peers announce open market repurchase programs. Massa et al. (2007) come to similar conclusions, but they also find that in order to mitigate the negative information spillover effect, rival firms in concentrated industries mimic their peers' repurchase behavior.

2.2. Seasoned equity offerings

The rich literature on SEO announcement effects suggests firms engaging in seasoned equity offerings suffer negative announcement period returns. Myers and Majluf (1984) argue that there is information asymmetry between issuers and investors and issuers are only willing to issue equity below average quality. Therefore, new equity issues, on average, convey a negative signal on firms' value to the market. Lucas and McDonald (1990) also predict that equity issues send a negative signal to the market due to adverse selection problems or market timing. Masulis and Korwar (1986), Asquith and Mullins (1986), Barclay and Litzenberger (1988) and others provide empirical evidence that the market reaction is about −2.5% upon the announcement of an SEO. Loughran and Ritter (1995, 1997) support the market timing hypothesis and suggest that firms issue seasoned equity offerings when managers believe their firms are overvalued. Some recent studies come to different conclusions. DeAngelo et al. (2010) show that while market timing and the corporate life cycle can explain why a firm conducts an SEO, the need for cash is the primary motivation to pursue an SEO. McLean (2011) suggests that equity issues are precautionary moves for firms in order to increase cash savings while Walker and Yost (2008) suggest that investments in R&D and fixed assets are the primary equity issuance motives.

Several studies find that the information content differs depending on the type of shares offered in the SEO—primary shares versus secondary shares.[3] Primary shares are newly created shares by a public firm, and secondary shares are existing shares offered by company insiders. The information content conveyed by primary share issuers and secondary share issuers is different as indicated by many studies such as Asquith and Mullins (1986), Lee (1997), Clarke et al. (2004), and Roskelley and Gokkaya (2011). Secondary shares are more likely to signal to the market that insiders are taking advantage of market timing and trying to profit from selling overvalued equity. Because these two types of offerings can send different signals to the market about the SEO firm, the information spillover to rival firms is likely to differ as well.

3. Data and empirical results

3.1. Data and descriptive statistics

Our SEO sample is gathered from Thomson Financial's Securities Data Company (SDC) database over the period 1997 to 2006. Our beginning date coincides with the first full year of data available on SEC's Edgar database. Our ending date is restricted to 2006 so that we have available data from CRSP to compute long-run returns. Our sample consists of U.S.-listed firms with full

[3] An offering can be composed of a mix of both types of securities. In this paper, following Lee (1997) and Clarke et al. (2004), we distinguish between primary and secondary offerings as those that contain more than 50% of the source of capital. We conduct a robustness check on pure primary offerings and pure secondary offerings. The signs of market reaction to rivals remain unchanged and significant for both groups.

stock and financial information on CRSP/Computstat merged (with at least 150 trading days each year on CRSP). Further, we eliminate utilities and financials (4-digit SIC codes 4900 to 4949 and 6000 to 6999, respectively) and issuers with offer prices less than $3 and proceeds lower than $5 million. Similar requirements are applied to the construction of rival firms in our sample. Rivals are firms within the same 4-digit SIC code as the issuing firm. Our final sample of SEO firms contains 1777 firm-year observations in Table 1.

As shown in Table 1, the sample is generally equally distributed across time with the highest frequency observed in 1997 with 258 observations and the lowest in 2005, which has 134 observations. Likewise, no consistent pattern is observed for the amount of proceeds or the relative size (amount raised scaled by the market capitalization of the firm). The average firm raises $168 million from the offering, which is 74% relative to total assets before the offering. Most shares created in the offering are primary, or newly issued shares, which account for 70% of the issues, on average.

We construct a variable, *INDSEOWAVE*, which is the number of SEOs announced 6-months before the event firm within the industry to measure the intensity of SEO activity. It has been documented that equity and M&A activity tends to come in waves (see Massa et al. (2007) and Harford (2005)). On average, there are 2.2 other firms in an industry issuing equity 6 months preceding the event firm's SEO announcement. We also report the relative SEO wave (*RELWAVE*), which is *INDSEOWAVE* scaled by the number of firms in the industry. The average is 4.7%. Finally, we construct *MKTSEOWAVE* to measure the number of total SEOs announced 6 months preceding the event firm's SEO announcement the event firm across all industries. The average is close to 100.

In Table 2 we compare SEO issuers to rival firms. The first few columns (1) present all SEO firms and the last two sets of columns (2 and 3) separate primary and secondary share issuers. SEO issuers are older and smaller in terms of market capitalization, but have larger sales-based industry market shares compared to rival firms. They also have a higher industry-adjusted debt ratio, but less free cash flow relative to assets.

We conjecture that announcements of primary or newly created shares will have an asymmetric spillover effect on rival firms with respect to secondary share issuers. Thus, we separate them in our analysis. Although we believe the spillover effect will be different between primary and secondary shares, firm characteristics between primary issuers, secondary issuers and their rivals are generally the same compared to the full sample.

3.2. Market reactions

In Table 3, we examine the market reaction to the announcement of an SEO for both event and rival firms. We compute abnormal returns using the market model,

$$R_{it} = \alpha_i + \beta_i R_{mt} + e_i \tag{1}$$

where R_{it} is the return of firm i at time t, α_{it} is the average abnormal return of firm i, and R_{mt} is the value-weighted market return. Abnormal returns AR_{it} are calculated as,

$$AR_{it} = R_{it} - \left(\hat{\alpha}_i + \hat{\beta}_i R_{mt}\right) \tag{2}$$

where $\hat{\alpha}_i$ and $\hat{\beta}_i$ are estimated from Eq. (1). The cumulative abnormal return (CAR) for firm i is calculated as

$$CAR_i = \sum_{i=1}^{T} AR_{it} \tag{3}$$

Table 2
SEO and rival firms' summary statistics.
This table provides summary statistics and comparisons of SEO firms and rival firms. Section (1) compares SEO firms and their rivals, section (2) compares primary share issuers and their rivals, and section (3) compares secondary shares and their rivals. All variables are as defined in the Appendix A. P-values from difference-in-means tests are provided. a, b, and c indicate statistical significance at 1%, 5%, and 10% levels, respectively.

	(1)			(2)			(3)		
	SEO firms	Rival firms	P-value (difference in means)	Primary share issuers	Rival firms	P-value (difference in means)	Secondary share issuers	Rival firms	P-value (difference in means)
AGE	21.21	15.97	0.000 [a]	19.07	15.62	0.000 [a]	26.74	17.39	0.000 [a]
SIZE ($M)	1948.41	2805.24	0.031[b]	1789.61	2854.83	0.024 [b]	2359.68	2603.66	0.735
MKTSHR	0.05	0.01	0.000 [a]	0.04	0.01	0.000 [a]	0.08	0.02	0.000 [a]
TOBINSQ	3.00	3.34	0.001 [a]	3.07	3.39	0.007 [a]	2.82	3.14	0.118
IND-ADJ DEBT RATIO (%)	6.98	6.41	0.000 [a]	7.00	6.66	0.000 [a]	6.93	5.40	0.000 [a]
IND-ADJ FCF	−0.08	−0.07	0.000 [a]	−0.11	−0.07	0.000 [a]	−0.03	−0.05	0.000 [a]
EPRATIO	−0.05	−0.18	0.003 [a]	−0.07	−0.19	0.034 [b]	0.01	−0.14	0.002 [a]
N	1777	87,897		1282	70,542		495	17,355	

Table 3
Market reaction to SEO announcement.
This table presents average cumulative abnormal returns (CARs) across event windows from day −1 to day +1 around announcements of seasoned equity offerings (SEOs) for both SEO firms and rival firms. The market model with returns from trading day −250 to trading day −11 are used to estimate CARs. Boehmer et al. (1991) t-statistics are provided in parentheses. The last row presents the difference between primary share offers and secondary share offers. P-values from difference-in-means tests are provided in parentheses. a, b, and c indicate statistical significance at 1%, 5%, and 10% levels, respectively.

	SEO firms		Rival firms	
	N	CAR (−1, +1)	N	CAR (−1, +1)
(1) All offers	1777	−2.48%[a]	87,897	0.14% [a]
		(−15.22)		(3.66)
(2) Primary shares	1282	−2.40% [a]	70,542	0.26% [a]
		(−12.29)		(6.20)
(3) Secondary shares	495	−2.68% [a]	17,355	−0.35% [a]
		(−9.03)		(−4.97)
(2)–(3)		0.28%		0.61% [a]
P-value		(0.449)		(0.000)

where T is the trading days around the event and AR_{it} is calculated from Eq. (2). Our estimation period is −250 to −11 trading days before the SEO event. We use the CRSP value-weighted market return as our market index.

In Table 3, we report abnormal returns for SEO issuers and their rival firms. The first column provides results for event firms. Over the three-day window surrounding the announcement date, similar to other studies, we document abnormal returns of −2.48%. When we separate the SEO announcement effect into issuers of primary shares versus issuers of secondary shares, we find similar negative market responses. The average three-day CARs for primary and secondary issuers are −2.40% and −2.68%, respectively, both of which are statistically and economically significant. The difference of 0.28% between the two types of offerings is not significantly different from zero.

The next column reports results to rival firms. The average rival firm experiences positive abnormal returns of about 0.14% when an event firm announces its intentions to seek equity capital. However, consistent with our expectations, we find an asymmetric impact to rival firms conditional on the offering type. Primary share issues elicit a 0.26% abnormal return on rival firms compared to secondary issues of −0.35%. This 0.61% difference is highly significant.[4]

The results of this analysis suggest that information spillovers indeed exist in the SEO context. Further, consistent with our hypothesis, the asymmetric reaction between primary and secondary share SEO announcements on rival firms indicates that a competitive effect exists for primary SEO announcements, but a contagion effect is found for secondary SEO announcements.

Our results are consistent with the view that the announcement of a primary SEO contains information content about industry prospects. The firm is likely issuing equity to invest in profitable projects, which indicates favorable industry conditions. Thus, rivals react positively. On the other hand, when a firm announces an SEO primarily consisting of secondary shares, market participants interpret this negatively for the entire industry. When insiders sell, it may indicate that the industry is overvalued and therefore rival firms are negatively impacted. We investigate these conjectures further in the next several tables.

In Panel A of Table 4 we explore two possible explanations for the competitive effect we observe in the previous table. One, as we conjecture, is that an SEO announcement reflects positive industry growth prospects. Another plausible explanation is that the market punishes the SEO firm either because of its need to issue equity, which may reveal cash flow problems or because management's desire to enjoy perquisite consumption from the extra cash from issuance (Jensen (1986)). However, it rewards rival firms that have healthier balance sheets. As a first step to examine these issues, we sort rival firms based on proxies for growth prospects and solvency measures.

We consider analysts' 1-year EPS forecasts as a proxy for industry growth prospects following Lin and McNichols (1998) and industry-adjusted free cash flow and debt ratios for solvency proxies. For each variable we sort rival firms into terciles. Based on EPS forecasts, we find that the market reaction is increasing, almost monotonically, with growth prospects. This is consistent with our industry growth prospects explanation for the competitive rival effect. We observe a u-shaped pattern based on free cash flow and a decreasing market reaction with rival firms' debt ratios. To explore the hypothesis that the market punishes SEO firms while rewarding rival firms with healthier balance sheets, rival firms are sorted based on SEO firms' solvency variables. Though the pattern is not monotonic, we find that the market reaction to rival firms is less positive when SEO firms have higher free cash flow. This is not consistent with the cash flow explanation for rivals.

Our explanation for the contagion effect for secondary offerings is that it signals industry overvaluation. In Panel B of Table 4, we examine the spillover impact when venture capitalists sell as part of the offering. Typically, VCs distribute their shares to limited partners as a means of exit. However, we find that in our sample, they are active in secondary offerings. For instance, we

[4] As discussed in Section 3.1, our sample period is dictated by data constraints. In order to determine VC participation we need prospectus data from Edgar, which is not fully available in 1997. However, we can examine if the pattern we document is confined to our sample period or is robust over longer periods of time without the use of VC data. Thus, we redo Table 3 using data from 1988 to 2006. Comparing the results for this larger time frame we find that the magnitude of the market reactions to rival firms from primary and secondary offerings is smaller, but still highly statistically significant.

Table 4
Market reaction to rivals upon SEO announcements.
This table presents market reaction to rival firms based on industry, rivals, and SEO firm characteristics (Panel A) and also when venture capitalists exit through SEOs (Panel B). We report average cumulative abnormal returns (CARs) across event windows from day −1 to day +1 around announcements of seasoned equity offerings (SEOs) for both SEO firms and rival firms. The market model with returns from trading day −250 to trading day −11 are used to estimate CARs. P-values from difference-in-means tests are provided in parentheses. Boehmer et al. (1991) t-statistics are provided in parentheses. a, b, and c indicate statistical significance at 1%, 5%, and 10% levels, respectively.

Panel A: market reaction to rivals based on industry, rivals, and SEO firm characteristics

	Industry analyst forecast		Rival free cash flow		Rival debt ratio		SEO free cash flow		SEO debt ratio	
	N	CAR (−1, +1)	N	CAR (−1, +1)	N	CAR (−1, +1)	N	CAR (−1, +1)	N	CAR (−1, +1)
1	21,224	−0.01%	23,486	0.25% [a]	23,482	0.43% [a]	23,432	0.41% [a]	22,868	0.02%
		(−0.12)		(3.44)		(6.71)		(6.87)		(0.41)
2	26,764	0.33% [a]	23,518	0.22% [a]	23,531	0.19% [a]	23,693	0.14%[b]	24,046	0.34% [a]
		(5.61)		(3.89)		(3.10)		(2.38)		(5.52)
3	22,505	0.41% [a]	23,489	0.30% [a]	23,480	0.15% [a]	23,388	0.22% [a]	23,579	0.39% [a]
		(6.74)		(5.96)		(2.67)		(3.45)		(6.31)
(3)–(1)		0.42%[a]		0.05%		-0.28% [a]		−0.19% [a]		0.37%
P-value		(0.000)		(0.598)		(0.001)		(0.001)		(0.000)

Panel B: market reaction to rivals when VCs exit

VCs exit	N	CAR (−1, +1)	N	CAR (−1, +1)
Yes	135	−2.66%[a]	4185	−0.83%[a]
		(−4.26)		(−4.64)
No	360	−2.69% [a]	13,170	−0.20% [a]
		(−8.02)		(−3.12)

find that in 27% of secondary SEOs, a VC participates in the offering. While the results in Table 4 indicate that there is no difference to the market reaction of the SEO announcement to the event firm, we find a dramatic difference in the spillover effect. When VCs sell in the SEO, rival firms experience −0.83% spillover compared to −0.20% when they don't. We interpret this univariate evidence consistent with the view that the information content of the secondary offer signals overvaluation in the industry. VCs are sophisticated investors and will exit at opportune times (Chahine et al. (2012)). The market interprets this as a signal of industry overvaluation.

3.3. Regression models of market returns

Although our evidence in Table 4 lends supports for the view that SEO announcements have important industry-specific spillover effects, those results do not properly control for potentially omitted factors. We thus examine information spillovers on rival firms controlling for SEO, firm-level and industry characteristics in a multivariate framework. The dependent variable is the (−1, +1)-day CAR (%) for rival firms (*RIVALCAR*). Our model in Table 5 takes the following form:

$$\begin{aligned} RIVALCAR = {} & b_0 + b_1 * PRIMARY(\%) + b_2 * SEOCAR + b_3 * VC + b_4 * TOP\ UNDERWRITER + b_5 ANALYST \\ & COVERAGE_{i,t-1} + b_6 * USE\ FOR\ R\&D + b_7 * USE\ FOR\ ACQUISITION + b_8 * SEO\ IND{-}ADJ\ FCF + b_9 * SEO\ IND{-}ADJ \\ & DEBT\ RATIO + b_{10} * SEORELSIZE + b_{11} * ANALYST\ FORECAST + b_{12} * MKTSHR_{i,t-1} + b_{13} * HHIQ_{i,t-1} + b_{14} \\ & * RELWAVE_{i,t-1} + b_{15} * LNDIST_{i,t-1} + b_{16} * LNSIZE_{i,t-1} + b_{17} * BHRET_{i,t-1} + b_{18} * RETVOL_{,t-1} + b_{19} * LNTOBIN_{i,t-1} + b_{20} * \\ & IND{-}ADJ\ DEBT\ RATIO_{i,t-1} + b_{21} * IND{-}ADJ\ FCF_{i,t-1} + b_{22} * EPRATIO_{i,t-1} + \varepsilon_{i,t-1}. \end{aligned} \quad (4)$$

The first set of characteristics is related to the SEO event firm. *PRIMARY* (%) is the percentage of primary shares in the issue. *SEOCAR* is the (−1, +1)-day CAR (%) of SEO event firms; *TOP UNDERWRITER* is a dummy variable equal to one if the SEO underwriter has a Carter–Manaster rank of 8, and zero otherwise, following Huang and Zhang (2011); *ANALYST COVERAGE* is the number of analysts that cover the SEO firm; *USE FOR R&D* and *USE FOR ACQUISITION* are dummy variables that equal one if the primary use of proceeds in the prospectus are for R&D purposes or acquisitions, respectively; *SEO IND-ADJ FCF* and *SEO IND-ADJ DEBT RATIO* are the event firm's free cash flow and debt ratios adjusted by the industry median value, respectively; *SEORELSIZE* is the proceeds raised in the offering scaled by total assets. VC is a dummy variable that equals one if a VC is one of the selling shareholders in the SEO, zero otherwise.

The next set of characteristics is related to the industry. *ANALYST FORECAST* is the median one-year EPS growth forecasts for the industry; *MKTSHR* is a firm's sales scaled by total industry sales; *HHIQ* is the quartile ranks of the Herfindahl–Hirschman Index calculated as the uncorrected sum of squares of sales of each firm in an industry divided by the aggregate sales in an industry; *AMSC* is the root-sum-square of the change in market share for all firms in an industry; *RELWAVE* is the number of firms in SEO event firm's industry that participated in an SEO six months before event firm scaled by number of firms in the industry; *LNDIST* is the natural log of the distance between rival firms and SEO firms.[5]

[5] Information needed to compute the distance between SEO firms and rivals is collected from U.S. Census Bureau.

Table 5
Regression analysis of information spillover to rival firms.
This table presents ordinary least squares (OLS) regressions of the market reaction to rival firms on SEO, industry, and firm characteristics. The dependent variable for each regression is the three-day CAR (%) of rival firms corresponding to their peers' SEO announcements. Columns (1) and (2) present results for the whole sample. Columns (3) and (4) present results of rivals for SEO firms that are primary share issuers. The last two columns present results of rivals of SEO firms that are secondary share issuers. All variables are as defined in the Appendix A. Heteroskedasticity consistent t-statistics are reported below coefficients. Industry and year fixed effects are included but not reported. a, b, and c indicate statistical significance at 1%, 5%, and 10% levels, respectively.

	Full sample		Primary issues		Secondary issues	
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	1.773	1.442	1.580	1.311	2.817	2.336
	(1.02)	(0.83)	(0.77)	(0.64)	(0.88)	(0.73)
SEO characteristics						
SEO CAR	0.082[a]	0.083[a]	0.094[a]	0.095[a]	0.028 [b]	0.032 [b]
	(17.44)	(17.49)	(17.70)	(17.66)	(2.42)	(2.66)
PRIMARY (%)	0.284[a]	0.271[a]				
	(2.78)	(2.62)				
VC					−0.743[a]	−0.776[a]
					(−3.14)	(−3.21)
TOP UNDERWRITER	0.130	0.133	0.038	0.027	0.945[a]	0.924[a]
	(1.56)	(1.58)	(0.41)	(0.29)	(3.91)	(3.80)
ANALYST COVERAGE	0.040	0.038	0.072	0.069	−0.246 [b]	−0.219[b]
	(0.91)	(0.86)	(1.43)	(1.35)	(−2.34)	(−2.06)
USE FOR R&D	0.705[a]	0.753[a]	0.757[a]	0.789[a]	−0.478	−0.595
	(6.67)	(7.07)	(6.71)	(6.95)	(−0.82)	(−1.01)
USE FOR ACQUISITION	−0.145[b]	−0.160[b]	−0.069	−0.081	−0.865[a]	−0.859[a]
	(−1.81)	(−1.99)	(−0.78)	(−0.92)	(−2.97)	(−2.94)
SEO IND-ADJ FCF	−0.487[a]	−0.471[a]	−0.545[a]	−0.541[a]	−0.869[c]	−0.946[b]
	(−4.65)	(−4.49)	(−4.94)	(−4.89)	(−1.94)	(−2.09)
SEO IND-ADJ DEBT RATIO	0.424[a]	0.459[a]	0.605[a]	0.600[a]	−0.776	−0.529
	(2.70)	(2.90)	(3.50)	(3.44)	(−1.60)	(−1.09)
SEORELSIZE	−0.001	−0.001	0.006[b]	0.006[b]	−0.002	−0.002
	(−0.48)	(−0.53)	(1.96)	(2.08)	(−0.64)	(−0.65)
Industry characteristics						
ANALYST FORECAST	0.726[a]	0.723 [a]	0.629 [a]	0.613[a]	0.687[b]	0.658[b]
	(5.90)	(5.81)	(4.49)	(4.31)	(2.27)	(2.14)
MKTSHR	0.566	0.627	0.315	0.348	0.328	0.090
	(0.67)	(0.74)	(0.31)	(0.34)	(0.21)	(0.06)
HHIQ	−0.314[a]		−0.202[c]		−0.414 [b]	
	(−3.54)		(−1.88)		(−2.36)	
AMSC		0.427		0.355		0.423
		(1.51)		(1.11)		(0.63)
RELWAVE	−9.252[a]	−8.859[a]	−12.166[a]	−11.441[a]	−20.006[b]	−21.685[b]
	(−3.39)	(−3.22)	(−4.01)	(−3.74)	(−2.38)	(−2.57)
LNDIST	−0.037[b]	−0.038[b]	−0.029	−0.031	−0.077 [c]	−0.078[c]
	(−2.08)	(−2.13)	(−1.46)	(−1.56)	(−1.95)	(−1.95)
Rival characteristics						
LNSIZE	−0.016	−0.024	0.002	0.001	−0.018	−0.001
	(−0.73)	(−1.09)	(0.07)	(0.04)	(−0.36)	(−0.02)
BHRET	0.114[a]	0.102[a]	0.099[a]	0.099[a]	0.047	0.054
	(4.22)	(4.04)	(3.27)	(3.27)	(0.59)	(0.67)
RETVOL	−0.299	−0.163	0.160	0.111	−3.018[b]	−3.256[b]
	(−0.78)	(−0.45)	(0.38)	(0.26)	(−2.46)	(−2.63)
LNTOBIN	−0.363[a]	−0.384[a]	−0.317 [a]	−0.331 [a]	−0.481[a]	−0.530[a]
	(−4.61)	(−5.12)	(−3.59)	(−3.73)	(−2.71)	(−2.95)
IND-ADJ DEBT RATIO	−0.362[b]	−0.241[c]	−0.344 [c]	−0.343[c]	−0.347	−0.211
	(−2.23)	(−1.67)	(−1.91)	(−1.90)	(−0.94)	(−0.56)
IND-ADJ FCF	−0.065	−0.090	−0.139	−0.154	0.609 [b]	0.547[c]
	(−0.58)	(−1.24)	(−1.13)	(−1.24)	(2.18)	(1.93)
EPRATIO	−0.143[c]	−0.002	−0.129	−0.104	−0.187	−0.172
	(−1.87)	(−0.14)	(−1.52)	(−1.22)	(−1.07)	(−0.98)
INDUSTRY/YEAR FE	Y	Y	Y	Y	Y	Y
N	87,897	87,897	70,493	70,493	17,404	17,404
R^2	0.012	0.012	0.014	0.014	0.024	0.024

The final set of characteristics is related to rival firms. *LNSIZE* is the natural log of rival firms' market values; *BHRET* is the raw buy-and-hold return over the past calendar year relative to the SEO file date. *RETVOL* is the idiosyncratic return volatility over the past calendar year before SEO file date. *LNTOBIN* is the natural log of Tobin's Q; *IND-ADJ FCF* and *IND-ADJ DEBT RATIO* are

calculated the same for rival firms as SEO event firms. *EPRATIO* is the earnings to price ratio. We also control for industry and year fixed effects.[6]

If primary share issues send a competitive signal to the market, we expect the sign of *PRIMARY* (%) to be positive. *SEOCAR* captures the impact of the market reaction to SEO firms on rival firms' CARs. If spillovers are important in the context of equity offerings, then we would expect this variable to be economically and statistically meaningful. The larger the announcement effect to the SEO firm upon its equity announcement, we anticipate a larger impact on rival firms. We conjecture that higher quality underwriters participating in the SEO will mitigate potentially negative spillover effects (Carter and Manaster (1990)). Analyst coverage is a proxy for asymmetric information. The more analysts that cover a firm the more information that is available to investors and we thus expect a smaller reaction to the number of analysts. We control for the use of proceeds. If firms are issuing equity to invest in R&D, this might be interpreted as a positive signal for industry prospects. If the firm is using equity proceeds to acquire other companies, this could send two opposing signals. On one hand, market participants might view this as the firm is using overvalued equity as a currency to buy other companies signaling industry overvaluation (see Rhodes–Kropf et al. (2005)). On the other hand, rival firms might be an acquisition target, which would be favorable for competitors. As described in Table 4, we test whether the SEO firm's solvency is related to spillovers in a multivariate model. A plausible explanation for the competitive effect we document is that the market punishes the event firm because they need costly external equity financing, but rewards rival firms because their balance sheets are healthier. We also control for the relative size of the SEO, but don't have any clear expectations on whether it will positively or negatively impact the rival firm's CAR. We nonetheless include it as a control.

The next four variables are industry-related. *MKTSHR* measures a firm's market share and thus competitive position in the marketplace. We expect this variable to be positively related to the rival's CAR because the impact of information spillover should be larger for firms with a greater market presence. *HHIQ* or the Herfindahl index rank measures industry concentration. Since lower HHI scores correspond to more competitive industries, we expect a negative relation between *HHIQ* and rival CARs for the same reason provided for market share. We also construct an alternative measure of product market competition, which is the aggregated market share changes (*AMSC*), following Xue (2009).[7] The higher the *AMSC*, the more competitive the industry is; therefore, we expect a positive coefficient for this variable. *RELWAVE* measures the tendency for firms in the industry to issue equity at a point in time. If a high level of equity issuances suggests overvaluation in an industry, we expect this variable to be negatively related to rival firms' CARs.

The last set of variables is rival firm attributes. Like the results in Table 4, we expect the more solvent the rival firm the higher the market reaction. The remaining variables are primarily included as controls.

Table 5 presents the results with heteroskedasticity-corrected t-statistics and the main independent variable is winsorized at 1% level. We first present the models for the full sample. *PRIMARY* (%) is positive and significant, suggesting that a larger percentage of primary shares trigger a stronger competitive effect on rival firms. We next present two models for each primary and secondary issuers using a different measure of industry concentration. In both models, *SEOCAR* is positive and significant at the 1% level. Thus, as predicted, the larger the SEO announcement effect, the larger the spillover to rival firms. Underwriter quality and the number of analysts following the SEO firm are not related to the spillover. However, intended R&D use is positive and highly significant indicating that equity offers used to invest in R&D send a positive signal to rival firms. Consistent with the results from Table 4, measures of the SEO firm's solvency (free cash flow and debt ratio) have a negative influence on rival firms.

Analyst 1-year EPS forecasts are positive and highly significant implying that the competitive spillover to rival firms is strongly related to the industry growth prospects explanation. The Herfindahl index rank (*HHIQ*) is negative and significant. This indicates that firms in concentrated industries suffer more negative market reactions. In the second model, *AMSC* indicates the same concentration effect, but the coefficient is insignificant. The coefficient of industry SEO waves (*RELWAVE*) is negative and highly significant. Thus, information spillovers have a more negative impact when more firms are engaged in SEO activity.

The last firm-specific variables indicate that spillovers are positively related to firm-specific firm performance, but negatively related to the natural log of Tobin's Q and firm's debt ratios. [8] The latter result supports the findings in Table 4.

The last set of models focuses on secondary offers. Consistent with primary offers, the reaction to rival firms is positively related to *SEO CAR*. SEOs where VCs are selling as part of the equity offer are negatively related to spillovers, which agrees with our findings in Table 4. SEO firms that use top underwriters mitigate negative spillovers suggesting that market participants value the reputational concerns of prestigious underwriters. The spillover is negatively related to SEO firm's number of analyst coverage, when the use of proceeds indicates a use for acquisition purposes, and industry-adjusted free cash flow.

[6] We also conduct tests clustered by SEO firms while controlling for industry and year fixed effects. Our interpretation for the main variables of interest remains unchanged.

[7] Ali et al. (2009) suggest that the Herfindahl index computed using Compustat data is a poor measure of industry concentration. We construct this AMSC measure as an alternative.

[8] We also consider that the SEO, and hence the spillover to rivals may be anticipated by investors. We estimate a two-stage model where in the first stage we model the probability of a firm participating in an SEO. We then use the estimated probability generated in the first model in the second stage OLS regression of rivals' (-1, +1)-day CARs. In the first stage we follow a model similar to Jagadeesh et al. (1993). The estimated probabilities generated from this model are included in our main OLS regression. We indeed find that the market reacts less negatively if the SEO is anticipated; however it does not change our inferences on any of our other variables.

The spillover to secondary offerings is similar to primary offers with respect to industry characteristics. For instance, we find the spillover is positively related to analyst EPS forecasts, but negatively related to the Herfindahl index and SEO waves. Finally, we find spillovers are negatively related to the natural log of Tobin's Q.

Overall, the regression results from Table 5 confirm our conjecture that the competitive effect to primary offers is primarily due to industry growth prospects while the contagion effect to secondary offers can be attributed to investors' fears of overvaluation. In unreported results, but worth mentioning, we find that the attributes from the *SEO event firm* (SEO characteristics) can explain more

Table 6
Probit regressions on the determinants of rival firms to follow their peers.
This table presents probit regressions on the determinants of market reaction to rival firms. The dependent variable is set to one if the rival announces an SEO within six months after its peer's SEO announcement and zero otherwise. SEOCARDUM is one if SEO announcement is positive and zero otherwise. All other variables are as defined in the Appendix A. Heteroskedasticity consistent p-values are reported in parentheses. Standard errors are cluster-corrected on both industry and year. a, b, and c indicate statistical significance at 1%, 5%, and 10% levels, respectively.

	Primary issues		Secondary issues	
Intercept	−3.129[a]	−2.851[a]	−3.322[a]	−3.094[a]
	(0.000)	(0.000)	(0.000)	(0.000)
SEO characteristics				
SEOCARDUM	0.156[b]	0.166[b]	−0.131	−0.122
	(0.013)	(0.011)	(0.346)	(0.381)
VC			−0.045	−0.100
			(0.795)	(0.553)
TOP UNDERWRITER	0.120[b]	0.124[b]	0.125	0.147
	(0.043)	(0.035)	(0.562)	(0.487)
ANALYST COVERAGE	−0.002	0.007	−0.105	−0.115
	(0.956)	(0.879)	(0.157)	(0.119)
USE FOR R&D	0.282[a]	0.226[b]	0.609	0.659
	(0.007)	(0.034)	(0.210)	(0.175)
USE FOR ACQUISITION	−0.038	−0.023	−0.416[c]	−0.405
	(0.576)	(0.739)	(0.098)	(0.119)
SEORELSIZE	−0.073[a]	−0.072[a]	−0.008	−0.007
	(0.001)	(0.001)	(0.347)	(0.347)
Industry characteristics				
ANALYST FORECAST	0.259[c]	0.304[b]	0.110	0.065
	(0.053)	(0.037)	(0.612)	(0.768)
MKTSHR	−4.538[b]	−4.372[b]	−3.773[b]	−3.626[b]
	(0.018)	(0.024)	(0.037)	(0.046)
HHIQ		−0.172		−0.243
		(0.233)		(0.004)
AMSC	0.682[a]		0.109	
	(0.002)		(0.843)	
RELWAVE	10.542[a]	11.311[a]	7.879[a]	9.776[a]
	(0.000)	(0.000)	(0.001)	(0.000)
LNDIST	−0.036[a]	−0.037[a]	−0.030	−0.029
	(0.003)	(0.004)	(0.322)	(0.360)
Firm characteristics				
CHGACQ	1.075[b]	1.078[b]	1.988[a]	1.995[a]
	(0.020)	(0.019)	(0.000)	(0.000)
CHGRD	0.578[a]	0.571[a]	0.166	0.153
	(0.002)	(0.002)	(0.704)	(0.702)
LNAGE	−0.223[a]	−0.229[a]	−0.204[a]	−0.209[a]
	(0.000)	(0.000)	(0.003)	(0.002)
LNSIZE	0.028	0.027	0.082[c]	0.080[c]
	(0.535)	(0.560)	(0.071)	(0.070)
BHRET	0.302[a]	0.298[a]	0.335[a]	0.350[a]
	(0.000)	(0.000)	(0.001)	(0.004)
RETVOL	−9.851[a]	−9.791[a]	−11.316 [a]	−10.898 [a]
	(0.001)	(0.001)	(0.002)	(0.003)
LNTOBIN	0.296[b]	0.286[b]	0.183	0.212
	(0.022)	(0.028)	(0.161)	(0.093)
IND-ADJ DEBT RATIO	0.408[b]	0.414[b]	0.412[b]	0.419[b]
	(0.017)	(0.015)	(0.026)	(0.021)
IND-ADJ FCF	−0.233	−0.238	−0.364	−0.342
	(0.478)	(0.481)	(0.196)	(0.215)
EPRATIO	−0.005	−0.007	0.137[b]	0.135[b]
	(0.612)	(0.249)	(0.040)	(0.049)
Industry/year cluster	Y	Y	Y	Y
N	71157	71157	17403	17403
R^2	0.015	0.0132	0.009	0.009

of the abnormal return than the *actual rival firm* characteristics (Rival firm characteristics). This provides further evidence that information spillovers in the SEO context indeed exist.

3.4. Do rival firms follow their SEO-issuing peers?

We now turn our attention to the probability of rival firms issuing equity. We hypothesize that the decision of a rival to issue equity is a function of their peer's SEO announcement. Following Benveniste et al. (2002), we conjecture that managers pay attention to their peer's corporate disclosures when deciding on their own corporate policies. If the market positively greets the firm's SEO announcement, rival firms will more likely follow their SEO-issuing peer and also issue equity. To test this hypothesis, we generally follow Jung et al. (1996), but also include the rival's change in acquisition activity (*CHGACQ*), change in R&D (*CHGRD*), and the natural log of firm age (*LNAGE*) following Kim and Purnanandam (2011) and Altı and Sulaeman (2012). In this analysis, our focus is on the market's perception of the issuance decision. We also create a variable *SEOCARDUM* which equals one if the SEO announcement elicits a positive response, zero otherwise.

In Table 6, the dependent variable is equal to one if a rival firm announces an SEO within six months of its peer's SEO. For the full sample of rival firms, the coefficient on *SEOCARDUM* is positive and significant, suggesting that rival firms are more likely to follow their peers within six months of the SEO announcement when the market views the issuance decision positively. Firms in more competitive industries are more likely to be SEO followers.[9] The remaining variables are consistent with the results presented in Table 5.

We find that the decision to issue equity is only related to the SEO's announcement return for primary issuers. For secondary share issues, the coefficient of *SEOCARDUM* is negative, but insignificant. Most other variables in the two models are similarly signed and hold similar significance levels. These results imply that non-SEO firms indeed pay attention to the market's assessment of their peers' SEO when deciding on whether or not to conduct their own for raising capital.

3.5. Long-run returns of SEO and rival firms

In our final analysis, we examine the long-run returns of SEO and rival firms. Our analysis thus far suggests that primary offers of equity are an indication of favorable industry prospects while secondary share offers may indicate overvaluation. Many studies such as Loughran and Ritter (1995), Loughran and Ritter (1997), and others have tested and confirmed the windows of opportunity hypothesis, which posits that insiders time the equity issuance decision when they believe the firm is overvalued. Our findings regarding secondary issues are consistent with this notion, but an analysis of long-run returns is necessary to support this view.

For this analysis, we restrict the sample to rival firms that never announce an SEO over the measurement period. We apply the four-factor model, which includes Fama and French's (1993) three factors plus Carhart's (1997) momentum factor. We obtain the factors plus the one-month t-bill rate from Wharton Research Data Services (WRDS). Our model in Panel A, Table 7 is estimated with monthly stock returns and takes the form:

$$R_{p,t} = \alpha_{p,t} + \beta_p R_{M,t} + S_p SMB_t + H_p HML_t + M_p MOM_t + e_{p,t} \tag{5}$$

where $R_{p,t}$ is the value-weighted portfolio return of portfolio p at month t minus one-month t-bill rate, $\alpha_{p,t}$ is the abnormal return of portfolio p at time t, $R_{m,t}$ is the monthly value-weighted return of the market minus one-month t-bill rate, SMB_t is the average return of small firms minus the average return of big firms, HML_t is the average return of high book-to-market firms minus the average return of low book-to-market firms, and MOM_t is the average return of winner firms minus the average return of loser firms.

The alpha, or intercept from the above model, is the abnormal return. For the full sample, rival firms outperform SEO firms by 0.47% per month. However, the alphas for both groups, SEOs and rivals, are not statistically significant. We separate primary issuers and secondary issuers in the next several columns. For primary issuers, there is no evidence of abnormal performance. The difference between SEO firms and rival firms is indistinguishable. For secondary issuers, while neither group shows abnormal performance, rival firms significantly outperform SEO firms by 0.59% per month.[10]

We also conduct an analysis of SEO and rival firms' long-run performance using buy-and-hold returns. To avoid long-run performance driven by frequent issuers, we include the first SEO announcement for an event firm if there are multiple SEO announcements for the same firm within three years. We match SEO firms with rival firms based on size, book-to-market, and momentum following Daniel et al. (1997).[11]

We have 1595 matched pairs of SEO firms and their corresponding rivals of which 1363 are primary and 232 are secondary share offerings. Panel B of Table 7 presents three-year buy-and-hold returns of SEO firms and their rivals. Our results are consistent with the calendar time portfolio approach. On average, we find no significant difference in the long-run performance

[9] Ali et al. (2010) show that firms in less competitive industries are less likely to conduct an SEO if this could disclose their corporate strategies to their rivals.
[10] We report value-weighted returns in this analysis. For robustness, we repeat the analysis using equal-weighted portfolio returns. The results are quantitatively similar.
[11] We first form 125 characteristics-sorted portfolios based on size, book-to-market, and momentum following Daniel et al. (1997). Then we assign SEO firms and rival firms into these portfolios. Our final sample contains only SEO firms and their corresponding rivals within the same portfolio.

Table 7
Three year long run performance of SEO firms and rivals using the calendar time portfolio approach.
This table presents long-run return analyses. Panel A reports time-series regressions of long run performance of SEO firms and rival firms using the calendar time portfolio approach. The Fama-French three factor model is used along with the Carhart's (1997) momentum factor. The estimation period is from January 1997 to December 2006. The dependent variable is the monthly value-weighted (VW) portfolio return. Heteroskedasticity corrected t-statistics are provided below coefficients. The last column in each sample presents the difference of coefficient estimates across models. a, b, and c indicate statistical significance at 1%, 5%, and 10% levels, respectively. Panel B presents three year buy-and-hold returns of SEO firms and rival firms after SEO announcements for all offers, primary shares, and secondary shares separately. Rival firms are matched to SEO firms based on size, book-to-market, and momentum following Daniel et al. (1997). P-values from tests on differences in means (or medians) are provided. The Wilcoxon test is conducted to test differences in medians. a, b, and c indicate statistical significance at 1%, 5%, and 10% levels, respectively.

Panel A: calendar time approach

Variable	Full sample			Primary issues			Secondary issues		
	SEO firms	Rival firms		SEO firms	Rival firms		SEO firms	Rival firms	
	(1)	(2)	(2)–(1)	(1)	(2)	(2)–(1)	(1)	(2)	(2)–(1)
Intercept	−0.0032	0.0014	0.0047[b]	−0.0029	0.0015	0.0044	−0.0047	0.0012	0.0059[c]
	(−1.46)	(1.44)	(2.02)	(−1.08)	(1.32)	(1.51)	(−1.57)	(0.90)	(1.80)
MKTRF	1.1841[a]	0.9515[a]	-0.2327[a]	1.1466[a]	0.9576[a]	−0.1890[a]	1.2501[a]	0.9612[a]	−0.2889[a]
	(20.90)	(38.99)	(−4.45)	(19.00)	(38.20)	(−2.89)	(18.62)	(31.28)	(−3.91)
SMB	0.1723[b]	−0.0865[a]	−0.2588[a]	0.2615[a]	−0.0961[a]	−0.3576[a]	0.1461[c]	−0.1097[a]	−0.2558[a]
	(2.37)	(−2.76)	(−4.12)	(3.61)	(−3.19)	(−4.56)	(1.81)	(−2.97)	(−2.89)
HML	−0.2386[a]	−0.2446[a]	−0.0060	−0.2239[a]	−0.2645[a]	−0.0406	−0.1979[b]	−0.3560[a]	−0.1581
	(−2.81)	(−6.98)	(−0.09)	(−2.86)	(−8.13)	(−0.48)	(−2.27)	(−8.92)	(−1.65)
UMD	0.0179	−0.0031	−0.0210	0.0974[b]	0.0117	−0.0857[c]	−0.1362[a]	−0.0624[a]	0.0737
	(0.41)	(−0.13)	(−0.53)	(2.13)	(0.62)	(−1.73)	(−2.68)	(−2.68)	(1.32)
Adj R^2	0.8620	0.9479		0.7858	0.9326		0.7866	0.9120	

Panel B: buy-and-hold returns

	N		SEO firms	Rival firms	Difference	P-value
			(1)	(2)	(2)–(1)	
All offers	1595	Mean	20.46%	30.00%	9.54%	−0.172
		Median	−15.84%	−16.21%	−0.36%	−0.450
Primary shares	1363	Mean	23.36%	29.74%	6.37%	−0.419
		Median	−16.52%	−18.10%	−1.58%	−0.696
Secondary shares	232	Mean	3.42%	31.56%	28.14%[b]	−0.028
		Median	−14.12%	−11.03%	3.10%	−0.289

between SEO firms and rival firms for primary share offerings, but do find a significant difference for secondary share offerings. Rivals outperform SEO secondary issuers by approximately 28% over three years. Thus, both the calendar time method and buy-and-hold approach come to similar conclusions—primary share issuers do not underperform, but secondary share issuers indeed underperform rival firms.

4. Conclusion

In this paper, we study information spillovers from one firm's SEO announcement to their industry rival firms. We find a pervasive information spillover effect to rival firms when a peer announces its intentions to issue equity. This spillover effect is conditional on the type of shares the SEO firm seeks to sell—primary versus secondary shares. Despite both types of equity capital eliciting an indistinguishable negative market reaction to the SEO firm, rivals experience a positive (0.26%) market reaction to primary offers, but a negative market reaction (−0.35%) to secondary offerings.

Why are there asymmetric responses to primary versus secondary SEO announcements? We interpret the evidence as follows. Primary offerings of equity signal to the market that industry prospects are favorable. Thus, this sends a competitive effect to rival firms. Consistent with this notion, we find that the market reaction to rival firms is positively related to analysts' one-year EPS forecasts. On the other hand, when an SEO firm announces a secondary offering in which insiders are selling their own shares, this sends a negative signal about potential industry overvaluation. Therefore, a contagion spillover effect is observed. We find that when VCs are selling as part of the offer, rival firms are hit particularly hard. Our long-run performance evidence is consistent with these views. We find that rival firms outperform secondary SEO issuers, but not primary share issuers.

We also examine the probability for a rival firm to follow its peer in issuing equity. We find that a rival is more likely to participate in the primary SEO market if its peer's SEO announcement elicited a positive abnormal return. Thus, if the market interprets the SEO announcement favorably, peer firms are more likely to follow suit. Rival firms in more competitive industries are more likely to issue equity when there is higher SEO participation within the industry. Thus, consistent with Benveniste et al. (2002) who find information spillovers in the IPO market influence other firms' decision to go public, we find similar evidence for seasoned companies.

Appendix A. Variables definition

Variable name	Description
Panel A SEO characteristics and description	
SEOSIZE	The natural logarithm of proceeds from a seasoned equity offering.
SEORELSIZE	SEO proceeds scaled by total assets.
SECDUM	One if secondary shares in the offer account for more than 50% of the offer; zero otherwise.
PRIMARY (%)	The percentage of primary issues
SEOCAR	The three-day cumulative abnormal return (CAR %) of SEO firms upon an SEO announcement.
SEOCARDUM	One if SEOCAR is positive; zero otherwise.
RIVALCAR	The three-day cumulative abnormal return (CAR %) of rival firms upon an SEO announcement.
VC	One if VCs exit in secondary offers and zero otherwise
TOP UNDERWRITER	One if the SEO underwriter has a Carter–Manaster rank of 8 and else zero.
ANALYST COVERAGE	The log of the number of analysts covering the firm the quarter before SEO announcements
USE FOR R&D	One if the proceeds are used for research and development expenses and else zero
USE FOR ACQUISITION	One if the proceeds are used for acquisition and else zero
SEO IND-ADJ FCF	Industry adjusted free cash flows for SEO firms
SEO IND-ADJ DEBT RATIO	Industry adjusted debt ratio for SEO firms
Panel B variables related to product market competition and description	
ANALYST FORECAST	The industry median of the one-year earnings growth forecast.
HHI	Herfindahl–Hirschman Index calculated as the uncorrected sum of squares of sales for each firm in an industry divided by the squares of aggregate sales in that industry.
HHIQ	The ranked HHI score, which is 1 to 4, based on the quartile breakpoints of HHI.
MKTSHR	Firm's annual sales divided by industry annual sales.
AMSC	The root-sum-square of market share changes within an industry.
INDSEOWAVE	The number of SEO announcements in an industry during the preceding six months before a firm's SEO announcement.
LNWAVE	The natural logarithm of the total number of SEOs in an industry in a year.
RELWAVE	Ratio of INDSEOWAVE over the number of firms within an industry.
MKTSEOWAVE	The total number of SEO announcements in the preceding six months before a firm's SEO announcement.
DISTANCE	The distance between headquarters of SEO firms and headquarters of rival firms.
LNDIST	The natural logarithm of distance between SEO firms and rivals.
Panel C firm characteristics and description	
AGE	Firm age is computed using firm's founding dates from Jay Ritter's website. In cases where the founding date is missing, the earliest date on CRSP is used.
LNAGE	The natural logarithm of firm age.
SIZE	Market capitalization of each firm at the end of fiscal year calculated as the price at the end of the fiscal year multiplied by the number of shares outstanding.
LNSIZE	The natural logarithm of market capitalization at the end of fiscal year.
TOBINSQ	The sum of market capitalization and total assets minus total common equity, scaled by total assets.
LNTOBIN	The natural logarithm of Tobin's Q.
DEBT RATIO	Long-term debt plus current debt over total assets.
IND-ADJ DEBT RATIO	DEBT RATIO minus industry median
FCF	Cash flows from investing activities plus cash flows from operating activities scaled by total assets following Dechow and Ge (2006).
IND-ADJ FCF	FCF minus industry median
EPRATIO	Ratio of earnings per share to price.
BHRET	Firms' buy-and-hold returns one year before their SEO filing date.
RETVOL	Volatility of returns one year before SEO filing date.
CHGACQ	Difference in dollar amount used for acquisitions in the year of SEO and the year before the SEO
CHRD	Difference in dollar amount used for research and development expenditures in the year of SEO and the year before the SEO

References

Ali, Ashiq, Klasa, Sandy, Yeung, Eric, 2010. Oligopolistic Industries and Corporate Disclosure Policy. SSRN eLibrary.

Ali, Ashiq, Klasa, Sandy, Yeung, Eric, 2009. The limitations of industry concentration measures constructed with Compustat data: implications for finance research. Rev. Financ. Stud. 22, 3839–3871.

Altı, Aydoğan, Sulaeman, Johan, 2012. When do high stock returns trigger equity issues? J. Financ. Econ. 103, 61–87.

Allen, Franklin, Gale, Douglas, 2000. Financial contagion. J. Polit. Econ. 108, 1–33.

Asquith, Paul, Mullins, David W., 1986. Equity issues and offering dilution. J. Financ. Econ. 15, 61–89.

Barclay, Michael, Litzenberger, Robert, 1988. Announcement effects of new equity issues and the use of intra-day price data. J. Financ. Econ. 21, 71–99.

Benveniste, Lawrence M., Busaba, Walid Y., Wilhelm, William J., 2002. Information externalities and the role of underwriters in primary equity markets. J. Financ. Intermed. 11, 61–86.

Benveniste, Lawrence M., Ljungqvist, Alexander, Wilhelm Jr., William J., Yu, Xiaoyun, 2003. Evidence of information spillovers in the production of investment banking services. J. Finance 58, 577–608.

Boehmer, Ekkehart, Masumeci, Jim, Poulsen, Annette B., 1991. Event-study methodology under conditions of event-induced variance. J. Financ. Econ. 30, 253–272.

Boone, Audra, Ivanov, Vladimir, 2012. Bankruptcy spillover effects on strategic alliance partners. J. Financ. Econ. 103, 551–569.
Burns, Natasha, Liebenberg, Ivonne, 2011. U.S. takeovers in foreign markets: do they impact emerging and developed markets differently? J. Corp. Financ. 17, 1028–1046.
Carhart, Mark M., 1997. On persistence in mutual fund performance. J. Finance 52, 57–82.
Carter, Richard, Manaster, Steven, 1990. Initial public offerings and underwriter reputation. J. Finance 45, 1045–1067.
Chahine, Salim, Arthurs, Johnathan D., Filatotchev, Igor, Hoskisson, Robert, 2012. The effects of venture capital syndicate diversity on earnings management and performance of IPOs in the US and UK: an institutional perspective. J. Corp. Financ. 18, 179–192.
Clarke, Jonathan, Dunbar, Craig, Kahle, Kathleen, 2004. The long-run performance of secondary equity issues: a test of the windows of opportunity hypothesis. J. Bus. 77, 575–603.
Daniel, Kent, Grinblatt, Mark, Titman, Sheridan, Wermers, Russ, 1997. Measuring mutual fund performance with characteristic-based benchmarks. J. Finance 52, 1035–1058.
DeAngelo, Harry, Linda, DeAngelo, Stulz, René M., 2010. Seasoned equity offerings, market timing, and the corporate lifecycle. J. Financ. Econ. 95, 275–295.
Dechow, Patricia, Ge, Weili, 2006. The persistence of earnings and cash flows and the role of special items: implications for the accrual anomaly. Rev. Account. Stud. 11, 253–296.
Erwin, Gayle R., Miller, James M., 1998. The intra-industry effects of open-market share repurchases: contagion or competitive? J. Financ. Res. 21, 389–406.
Fama, Eugene F., French, Kenneth R., 1993. Common risk factors in the returns on stocks and bonds. J. Financ. Econ. 33, 3–56.
Funke, Christian, Gebken, Timo, Johanning, Lutz, Michel, Gaston, 2008. Information Signaling and Competitive Effects of M&A: Long-term Performance of Rival Companies. SSRN eLibrary.
Harford, Jarrad, 2005. What drives merger waves? J. Financ. Econ. 77, 529–560.
Hameed, Allaudeen, Morck, Randall, Shen, Jianfeng, Yeung, Bernard, 2010. Information, Analysts, and Stock Return Comovement. SSRN eLibrary.
Hertzel, Michael G., Li, Zhi, Officer, Micah S., Rodgers, Kimberly J., 2008. Inter-firm linkages and the wealth effects of financial distress along the supply chain. J. Financ. Econ. 87, 374–387.
Hsu, Hung-Chia, Reed, Adam V., Rocholl, Jorg, 2010. The new game in town: Competitive effects of IPOs. Journal of Finance 65, 495–528.
Huang, Rongbing, Zhang, Donghang, 2011. Managing underwriters and the marketing of seasoned equity offerings. J. Financ. Quant. Anal. 46, 141–170.
Jagadeesh, Narasimhan, Weinstein, Mark, Welch, Ivo, 1993. An empirical investigation of IPO returns and subsequent equity offerings. J. Financ. Econ. 34, 153–175.
Jensen, Michael C., 1986. Agency costs of free cash flow, corporate finance, and takeovers. Am. Econ. Rev. 76, 323–329.
Jorion, Philippe, Zhang, Gaiyan, 2007. Good and bad credit contagion: evidence from credit default swaps. J. Financ. Econ. 84, 860–883.
Johnson, William C., Kang, Jun-Koo, Masulis, Ronald, Yi, Sangho, 2011. Supply-Chain Spillover Effects and the Interdependence of Firm Financing Decisions. SSRN eLibrary.
Jung, Kooyul, Kim, Yong-Cheol, Stulz, RenéM, 1996. Timing, investment opportunities, managerial discretion, and the security issue decision. J. Financ. Econ. 42, 159–186.
Kim, E. Han, Purnanandam, Amiyatosh K., 2011. Seasoned Equity Offerings and Investments. SSRN eLibrary.
Lang, Larry H.P., Stulz, Rene M., 1992. Contagion and competitive intra-industry effects of bankruptcy announcements: an empirical analysis. J. Financ. Econ. 32, 45–60.
Lee, Inmoo, 1997. Do firms knowingly sell overvalued equity? J. Finance 52, 1439–1466.
Lin, Hsiou-wei, McNichols, Maureen F., 1998. Underwriting relationships, analysts' earnings forecasts and investment recommendations. J. Account. Econ. 25, 101–127.
Loughran, Tim, Ritter, Jay R., 1997. The operating performance of firms conducting seasoned equity offerings. J. Finance 52, 1823–1850.
Loughran, Tim, Ritter, Jay R., 1995. The new issues puzzle. J. Finance 50, 23–51.
Lucas, Deborah J., McDonald, Robert L., 1990. Equity issues and stock price dynamics. J. Finance 45, 1019–1043.
Massa, Massimo, Rehman, Zahid, Vermaelen, Theo, 2007. Mimicking repurchases. J. Financ. Econ. 84, 624–666.
Masulis, Ronald W., Korwar, Ashok N., 1986. Seasoned equity offerings: an empirical investigation. J. Financ. Econ. 15, 91–118.
McLean, R. David, 2011. Share issuance and cash savings. J. Financ. Econ. 99, 693–715.
Myers, Stewart C., Majluf, Nicholas S., 1984. Corporate financing and investment decisions when firms have information that investors do not have. J. Financ. Econ. 13, 187–221.
Rajan, Raghuram G., 1994. Why bank credit policies fluctuate: a theory and some evidence. Q. J. Econ. 109, 399–441.
Rhodes–Kropf, Matthew, Robinson, David T., Viswanathan, S., 2005. Valuation waves and merger activity: the empirical evidence. J. Financ. Econ. 77, 561–603.
Roskelley, Kenneth, Gokkaya, Sinan, 2011. Asymmetric Revisions to Primary and Secondary Shares in Seasoned Equity Offerings. SSRN eLibrary.
Shahrur, Husayn, Venkateswaran, Anand, 2009. Industry prospects and acquirer returns in diversifying takeovers. J. Financ. Res. 32, 23–51.
Slovin, Myron B., Sushka, Marie E., Polonchek, John A., 1992. Informational externalities of seasoned equity issues: differences between banks and industrial firms. J. Financ. Econ. 32, 87–101.
Song, Moon H., Walkling, Ralph A., 2000. Abnormal returns to rivals of acquisition targets: a test of the “acquisition probability hypothesis”. J. Financ. Econ. 55, 143–171.
Walker, Mark D., Yost, Keven, 2008. Seasoned equity offerings: what firms say, do, and how the market reacts. J. Corp. Financ. 14, 376–386.
Xue, Song, 2009. Product market competition and information content in earnings announcements. Working Paper. University of Florida.