The Cycle of Seasoned Equity Offerings and its Relation to the Cycle of Initial Public Offerings

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August 2004

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Abstract

We study the cycle of seasoned equity offerings from 1973 to 2002 and its relation to the cycle of initial public offerings. We first empirical examine the cycle of seasoned equity offerings and find that there is significant cycle phenomenon, yet not as profound as that of IPOs. Then we study the relation between the two cycles and find that IPO cycles lead SEO cycles. We also investigate the effect of economic factors on these two cycles and find many are common to both cycles. However, consistent with previous studies, the timing issue is most important for seasoned equity offerings; information asymmetry and investment opportunity also explain IPO cycles in addition to timing.

I. Introduction

In this paper, we study the cycles of seasoned equity offerings (SEOs) and the relation of the cycles of SEOs to that of initial public offerings (IPOs). We also investigate what economic and non-economic factors explain IPO cycles and what factors explain SEO cycles.

The cycles of IPOs have been documented in several studies [see for example, Ibbotson and Jaffe (1975), Ibbotson, Sindelar and Ritter (1988), and Lowry and Schwert (2002)]. All these studies find that there are hot and cold markets for IPOs, where hot markets are defined as periods in which there are more private companies going public and new issues are more underpriced and cold markets are defined as periods in which there are fewer private companies going public and new issues are less underpriced.

Recently, Lowry (2003) investigates why the IPO volume fluctuate over time. She tests three different hypotheses: information asymmetry, investor sentiments, and demand for capital, and finds that all three are related to changing IPO volume over time. However, information asymmetry and demand for capital hypotheses receive stronger support than investor sentiment hypothesis.

Pástor and Veronesi (2003) also study the fluctuation of IPO volume over time. They develop a model of IPO timing and predict that IPO waves are caused by three broad market conditions: declines in expected returns, increase in expected profitability and increase in prior uncertainty. Thus, IPO waves should be preceded by high market returns, followed by low market returns, and accompanied by high stock prices. We term their predictions investment opportunity and timing hypotheses. The investment opportunity hypothesis is similar to the demand for capital hypothesis in Lowry (2003).

Pástor and Veronesi also contend that their model might also be applied to public firms in that public firms might solve the same optimal timing decision similar to IPOs, and thus we might also observe SEO waves. Several studies have also examined the effect of asymmetric information on SEOs and whether firms knowingly time the market conditions to sell additional shares [see for example, Lucas and McDonald (1990), Choe, Masulis and Nanda (1993), and Bayless and Chaplinsky (1996)].

All the hypotheses that have been proposed in the studies cited above should apply to both IPOs and SEOs. We group them into four hypotheses, namely investment opportunity, asymmetric information, investor sentiments, and timing. These hypotheses are not mutually exclusive, and indeed they share many common predictions.

The cycles of SEOs over long time period have not been investigated. Thus, our first objective in this paper is to empirically investigate whether the seasoned equity offerings also show the same cycles. Then, we further study the relation between these two cycles. If equity offerings, whether IPOs or SEOs, are affected by the same economic and non-economic factors, we might simply observe the same cycles of both IPOs and SEOs. For example, when private firms have ample investment opportunities and high demand for capital, already public firms might face the same situation. And the consequence is that both private and public firms issue more equity shares at the same times and the IPO and SEO cycles coincide with each other.

However, seasoned firms might not have some of the problems facing private firms going to the public market for equity the first time, or less severely. For example, after having been publicly traded for years, seasoned firms may have more asset-in-place, which suggests that seasoned firms are less risky than unseasoned firms on average.

Investors will also have less severe lemons problems when they purchase shares in SEOs since the information asymmetry problem is less profound for seasoned firms after they have been followed by financial analysts and have disclosed substantial information over years. For IPOs, there have been notions that during certain periods no firm can go to the public market for new capital, but seasoned might still be able to do so. Thus, one possibility is that there might be less significant cyclical pattern in SEO markets.

For those reasons, we argue that the demand for capital and future investment opportunities will affect both IPOs and SEOs. The information and investor sentiment factors will affect IPOs more than SEOs. Both unseasoned firms and seasoned firms may time the market conditions to sell new shares when the overall market valuation is high. Thus, we further investigate which hypothesis or a combination of hypotheses can explain IPO cycles and which explain SEO cycles.

We find similar hot-and-cold markets over the last three decades for SEOs. Using monthly number of SEOs as a measure of SEO volume, we find that there is significant variation in the monthly SEO volume but smaller than that in monthly IPO volume. It appears that in certain time periods private firms simply cannot go public by issuing equity. However, seasoned firms issued equity in every month in the thirty years from 1973 to 2002. Although the SEO markets also show the same cycles, but the cycles of SEOs are shorter than those of IPOs. The autocorrelations of SEO monthly volume are only significant for the first eight lags; however, for IPOs, they are significant up to the 12^{th} lag.

We also try to discern whether there exist a lead/lag relation between IPO and SEO volume by using a sixth order vector-autoregression analysis. We find that the lagged IPO volume collectively affect SEO volume and lagged SEO volume also collectively affect IPO volume. However, the lagged IPO volume is positively related to the SEO volume, which means high IPO volume causes high SEO volume; but the lagged SEO volume is negatively related to IPO volume, which means after the SEO market gets hot, the IPO market turns cold or normal.

Lastly, we test whether some economic and non-economic factors affect IPO and SEO cycles differentially. These factors are suggested by four hypotheses: information asymmetry, investor sentiments, future investment opportunities, and timing. When we test each of the hypotheses separately we find that all the hypotheses, information asymmetry, investor sentiments, future investment opportunities, and timing, can explain IPO cycles, but to varying degrees. When we examine all the hypotheses in one regression, we still find support for asymmetric information, future investment opportunities and timing hypotheses. However, when tested separately, all the hypotheses can only explain less of the variation of the SEO cycles than IPO cycles. In the multiple regression for SEO cycles, the only hypothesis receives empirical support is timing hypothesis. SEO volume is significantly related to past and current market returns. Our evidence provides strong support for timing hypothesis for both IPOs and SEOs.

We briefly review the relevant literature in next section. Section 3 describes our sample selection process and sample characteristics. We examine both IPO cycles and SEO cycles and the relation between the two in section 4. Section 5 shows multivariate analysis of economic and non-economic factors affecting IPO and SEO cycles, and section 6 concludes.

II. Relevant Literature

Firms can issue new stocks in initial public offerings (IPOs) or, after they have gone public, sell additional shares in seasoned equity offerings (SEOs). While initial public offerings and seasoned public offerings are both important ways for firms to acquire equity capital from financial markets, they have many different features and, thus studies, both theoretical and empirical, on these two capital raising activities have been separated.

The early studies on SEOs [see for example, Mikkelson and Partch (1986), Asquith and Mullins (1986), and Masulis and Korwar (1986)] focus on the stock market reactions to the announcements of additional share offerings. These studies find that the market reacts to the announcements negatively. The stock prices of firms announcing the seasoned issues on average decrease by two to three percent on or around the announcement dates. This negative announcement effect is generally interpreted as consistent with the Myers and Majluf (1984) adverse selection model. Lucas and McDonald (1990) also present a theoretical model predicting the negative announcement effect of seasoned equity offerings. They also predict that equity issues should be preceded by a positive abnormal return on the stock and an abnormal rise in the market as well.

Choe, Masulis and Nanda (1993) argue that firms will sell seasoned equity when they face lower adverse selection costs, which occurs in periods with more promising investment opportunities and with less uncertainty about assets in place. Thus, firm announcements of equity issues are predicted to convey less adverse information about equity values in such periods. Using the average negative price reaction to seasoned stock offering announcements as proxy for adverse selection effects, they find that adverse selection is significantly lower in expansionary periods and in periods with a relatively larger volume of equity financing.

Bayless and Chaplinsky (1991) find that the substantial variation in the market reaction to new debt and equity issues depends on whether the firm's choice of security conforms to investor's prior beliefs as to the type of security to be issued. Debt issues made when the probability of equity issue is high generate significant positive announcement day abnormal returns. Likewise, equity issues made when the probability of debt issue is high generate more negative announcement returns than when the probability of debt issue is low. They interpret these results as revealing managers' beliefs of under- and overvaluation of their firms' shares respectively.

Bayless and Chaplinsky (1996) find that the price reaction to equity issue announcements in high volume periods is lower than in low equity volume periods and interpret this evidence as supporting the existence of windows of opportunity for equity issues that can be partially explained by reduced level of information asymmetry.

Studies of IPOs have focused on explaining two stylized facts. The first is the initial returns (underpricing) observed on the day when issuing firms first publicly trade [see for example, Beatty and Ritter (1986), and Loughran and Ritter (2004), among others]. The initial return is measured as the difference between the first day closing price and the offer price divided by the offer price.

The second fact is the cycles in the number of IPOs and in the average first day returns. There are more firms going public and new issues are more underpriced in hot markets than in cold markets. The cycle of initial public offerings has been documented in Ibbotson and Jaffe (1975) among others. Lowry and Schwert (2002) investigate the IPO market cycle and in particular study the relation between IPO volume and IPO underpricing. Lowry (2003) studies the relative explanatory power of three hypotheses in explaining the IPO volume fluctuation. She finds that firms' demand for capital and investor sentiment are the most important determinants of IPO volume. Adverse selection costs are less important, though statistically significant.

Pástor and Veronesi (2003) develop a model of IPO timing and predict that IPO waves are caused by three broad market conditions: declines in expected returns, increase in expected profitability and increase in prior uncertainty. Thus, IPO waves should be preceded by high market returns, followed by low market returns, and accompanied by high stock prices. They contend that their model might also be applied to public firms in that public firms might solve the same optimal timing decision similar to IPOs, and thus we might also see SEO waves.

The long run performance is common to both areas. Although researchers have different interpretations, it is found that firms issuing both IPOs and SEOs underperform matching firms in subsequent years, usually three to five years [Loughran and Ritter (1995), and Spiess and Affleck-Graves (1995)]. This underperformance of both seasoned and newly public firms is interpreted as firms successfully time the market. The study by Baker and Wurgler (2000) suggests that firms time the market component of their returns. They study the relation between equity issues (IPOs and SEOs) in total new equity and debt issues and subsequent stock market returns. Firms issue more equity than debt just before periods of low market returns.

III. Data and Sample Description

A. Data

We use Thomson Financial Global New Issues data as our IPO and SEO sample. We first obtained a total of 22645 common stock offerings in the United States for the period from 1973 to 2002. Among these, 10505 are initial public offerings and 12140 are seasoned equity offerings. We then follow Lowry and Schwert (2002) to discard closed end funds, unit offerings, real estate investment trusts, and issues by foreign companies (ADRs). We further delete issues with an offer price less than three dollars and total proceeds raised less than 0.5 million dollars. We also require that all the issues must have at least 25 percent of shares issued are primary shares. Finally, we have a total of 6716 IPOs and 6900 SEOs. We construct both monthly IPO volume series and SEO volume series measured by number of issues (N_{IPO}, N_{SEO}). We also scale both series by the total number of public companies at the end of prior month ($N_{IPO,\%}$, $N_{SEO,\%}$). The scaled monthly number of offerings controls for the change of economic activity over time.[1]

To investigate whether IPO and SEO cycles are affected by common or unique economic factors, we also form other variables to proxy for various economic factors. As discussed in Section I, there are four hypotheses that have been proposed to explain the variation of the IPO market activity. We construct the variables that proxy for these four hypotheses following Lowry (2003) and Pástor and Veronesi (2003).

[1] Another way to measure monthly IPO or SEO volume is to use total proceeds raised each month deflated by the market capitalization. Lowry (2003) shows that the number of issues series and proceeds series are highly correlated with a correlation of 0.90 between 1970 and 1996. Thus, we only use the monthly number of issues as a measure of IPO and SEO volume.

We use three proxies for investment opportunities hypothesis: the aggregate market-to-book ratio, the discount rate and expected future earnings growth. The lower discount rate may cause many companies to find more attractive investment projects. We use one-year t-bill rate (R_F) to proxy for this discount rate. The monthly t-bill rate is obtained at the Federal Reserve's website. To proxy for future investment opportunities we also construct the monthly aggregate market-to-book (MTB) ratio across all public firms available on CRSP and Compustat. We calculate for each firm the market value (number of shares outstanding multiplied by monthly closing price) each month. We then divide the market value by last fiscal year-end book value (extracted from Compustat) to obtain the MTB for each firm each month. The monthly MTB is the average market-to-book ratio across all firms in that month. We also use financial analysts' forecast of long term earnings growth ($ISEB_{MEAN}$) as another proxy for future investment opportunities. The analysts' long tern earnings growth forecast is obtained from I/B/E/S. For each month, we calculate the average forecasted long term growth rate by averaging all the forecasts made in that month.

To measure the effect of asymmetric information on equity issuing activities, we construct three proxies. The first is the standard deviation of abnormal returns around earnings announcement day ($ABRET_{STD}$) for each month. For $ABRET_{STD}$, we first calculate the three day cumulative abnormal returns for all the firms made earnings announcement in that month, and then compute the standard deviation of all the abnormal returns observed around earnings announcement day in that month. The abnormal return is the difference between stock return and the return of the market. We use equally weighted market returns. Another is the standard deviation of analysts' forecasts of long term earnings growth for each month ($IBES_{STD}$). The third is the standard deviation of daily market returns within a month ($MRET_{STD}$). All these are expected to be negatively related to IPO and SEO volumes.

To test timing hypothesis, we construct aggregate market return series. The market returns are equally weighted monthly returns. For each month, we calculate issuing month market return (MRET), previous month market return ($MRET_{-1}$), three month prior market returns ($MRET_{-3, -1}$), one year prior market returns ($MRET_{-12, -1}$), and one month after market returns ($MRET_{+1}$), three month after market returns ($MRET_{+1, +3}$) and one year after market returns ($MRET_{+1, +12}$). These market returns are used to test whether both seasoned and unseasoned firms successfully time the market to sell shares when the overall market valuation is high. More specifically, the past market returns are expected to be positively related to IPO and SEO volumes, but future market returns are expected to be negatively related to IPO and SEO volume.

To test investor sentiment hypothesis, we use future market returns as in Lowry (2003). We also use another variable to proxy for investor sentiments, namely consumer sentiment index (SINDEX). The consumer sentiment index is obtained at the website of The Conference Board, Inc.

To control for the seasonality in the equity issuance market, we construct an indicator variable for the first quarter of the year (QTR1). Lowry (2003) shows that there are significantly fewer issues of IPOs in the first quarter of the year. We also use a business cycle indicator EXPANSION which has a value of one if a month is in the expansionary phase of a cycle and zero otherwise.

B. Sample Description

Table 1 describes our sample characteristics. We report the mean, median, standard deviation, minimum value, and maximum value for all the variables to be used later in our multivariate analysis. The average monthly numbers of IPOs and SEOs are quite similar, 18.66 for IPOs and 19.17 for SEOs. However, the standard deviation of monthly number of IPOs (18.14) is much higher than that of SEOs (11.97), which suggests that the IPO market is more volatile than the SEO market. The smallest monthly number of SEOs for the entire sample period is 1. However, there are 38 months in the 30 year period without any IPOs.

The scaled number of monthly IPOs ranges between zero and 1.05% with a mean value of 0.26%. The scaled monthly number of SEOs ranges between 0.01% and 1.28% with a mean value of 0.29%. Again, the standard deviation of the monthly number of SEOs (0.19%) is smaller than that of monthly number of IPOs (0.24%).

The aggregate market-to-book ratio of equity has a mean of 3.24 and varies between 1.12 and 5.97. The risk-free t-bill rate averaged 7.2% over the sample period. We are only able to get 253 monthly observations for the mean and standard deviation of analysts' long term earning growth forecasts since it became available only after December 1981. And the monthly consumer confidence index started available after 1978. The average monthly market return is 1.2% with a standard deviation of 5.9%. The average standard deviation of daily market returns is around 0.6%. The three month market returns average about 3.7% and the one year market returns average 17.2%.

IV. The Cycles of IPOs and SEOs

In this section, we conduct empirical analysis of IPO and SEO market cycles and report the results. We first show the cycles of both IPOs and SEOs. Then we use autocorrelation analysis to further study the IPO and SEO cycles. We also investigate the relation between monthly IPO and SEO series using cross-correlation analysis.

A. Cycles of IPOs and SEOs

Figure 1 plots the monthly number of IPOs and SEOs form 1973 to 2002. Figure 1 (A) uses raw number of IPOs and SEOs. Figure 1 (B) uses the scaled number of IPOs and SEOs, the percentage of number of IPOs and SEOs as the number of public firms at the end of previous month. The solid (dotted) line denotes the monthly number of IPOs (SEOs). These figures show that there are significant cycles in both IPO and SEO monthly series. But the peaks of the two series do not always coincide with each other, which suggest that there might exist a lead/lag relation between the two series. These figures also show that the variation of monthly number of SEOs is smaller than that of IPOs.

Another way to look at the difference between the variations of monthly number of IPOs and SEOs is to compare the number of months in different market conditions. Table 2 shows the comparison. In table 2, we divide all the months into hot, normal and cold months according to the monthly number of IPOs (SEOs). If the number of IPOs (SEOs) in any month is less than 5 then we denote that month as a cold month. If the number IPOs (SEOs) in any month is more than 30 then we denote that month as a hot month. All other months with number of IPOs (SEOs) between 5 and 30 are denoted normal months.[2] We find that over the last 30 years, only 24 percent of the months are cold or hot for SEOs, but the cold, normal and hot months for IPOs are pretty much evenly distributed. This evidence further shows that the variation of the monthly number of SEOs is smaller than that of IPOs. The difference between the variations of monthly number of IPO sand SEOs also suggests that the IPO and SEO market cycles might be affected by different factors.

B. Autocorrelation Analysis of IPO and SEO Cycles

In this part we use autocorrelation analysis to study the cycles of IPOs and SEOs. We empirically document the autocorrelations of monthly number of IPOs and SEOs. We compute the autocorrelations of both series up to the 12^{th} lag.

Table 3 shows the results of autocorrelation analysis for each series. Figure 2 shows the plots of autocorrelations of monthly number of IPOs and SEOs. The autocorrelation of monthly number of IPO series decays very slowly, it is 0.820 at lag 1 and 0.410 at lag 12 and all are significantly higher than two standard deviations. The autocorrelation of SEO series also generally decays with the length of lags from 0.741 at lag 1 to 0.137 at lag 12. The autocorrelations for SEO series are two standard deviations away only for first 7 of the 12 lags. The difference between the autocorrelations of IPO and SEO series suggests that the cold or hot markets for IPOs might last longer than that of SEOs and thus cause the IPO series to show significant correlations at more distant lags. It might also be consistent with the evidence presented in Part A that the variation of monthly number of SEOs is smaller than that of IPOs. To summarize, using monthly

[2] The numbers we use to divide the months into hot, normal, and cold months are arbitrary. It is just for illustration purpose. We find the same pattern using other numbers.

IPO and SEO series from 1973 to 2002, we find similar autocorrelations in monthly number of SEOs as well as IPOs.

C. The Relation between IPO and SEO Cycles

Now we turn to the examination of the relation between IPO volume and SEO volume. As suggested by previous studies, both IPOs and SEOs may be affected by the same economic and non-economic factors, but some factors might affect these two differentially. Thus, it is interesting to first look at the relation between these two series. We use two tests, one is cross-correlation analysis, and the other is the vector-autoregression (VAR) analysis.

Figure 3 shows the cross-correlation between IPO and SEO monthly volume. The reported results are the correlation between current IPO volume and 12 lag and lead SEO volume. The figure shows that short-lagged values of SEOs are positively correlated to IPO volume and IPO volume is positively related to future SEO volume. The figure also suggests that the effect of IPO volume on SEO volume might be stronger than the effect of SEO volume on IPO volume.

Table 4 reports the results of VAR analysis for IPO and SEO volumes. The own lags of both IPOs and SEOs are significantly positive for first two lags, which is consistent with simple autocorrelation analysis. The fourth lag of IPO volume and sixth lag of SEO volume are also significantly positive. Interestingly, the first lag of IPO volume is significantly positively related to SEO volume and the second and fifth lags of SEO volume are significantly negatively related to IPO volume. None of the other lags is significant in either equations. These results suggest two interesting observations. One is that IPO volume leads SEO volume. That is high IPO volume leads to high SEO volume next month. The other fact is that the high SEO volume leads to lower IPO volume two months later. Collectively, after controlling for their own lags, both past IPO and SEO volumes are related to future SEO and IPO volumes. It is not possible to discern the causal relation between these two series. The only explanation might be that the hot IPO market leads to hot SEO market and after both markets have been hot for a couple of months, then the IPO market gets normal or cold.

To summarize, we find the market cycles for IPOs as well as SEOs. However, the SEO market is less volatile than IPO market. The IPO hot or cold markets last longer than those of SEOs. From cross-autocorrelation and VAR analysis, it appears that the IPO volume leads the SEO volume.

V. Multivariate Analysis of IPO and SEO Cycles

To investigate whether IPO market volume and SEO market volume are affected by the same or unique economic and non-economic factors, we utilize a multivariate regression analysis. The dependent variables are monthly number of IPOs ($N_{IPO, \%}$) and SEOs ($N_{SEO, \%}$) scaled by the number of public firms at the end of previous month. We report the results in table 5. In table 5 we first examine whether information asymmetry, investor sentiments, timing, and investment opportunities explain IPO and SEO individually and then put all the factors in one model to see which factors have the most explaining power after controlling for other factors. In all columns, we control for seasonality effect by using a first quarter indicator QTR1, and in columns 1, 2, 3, and 6, we control for business cycles by using an indicator EXPANSION.

Panel A reports the results for IPO volume and Panel B reports the results for SEO volume. Column 1 shows the effect of information asymmetry on IPO and SEO volume. We use three proxies for information asymmetry. The first is the average standard deviation of forecasts of long term earnings growth made by financial analysts in a month as reported by I/B/E/S ($IBES_{STD}$). The second is the standard deviation of abnormal returns for all firms making earnings announcement in a month ($ABRET_{STD}$), and the third is the standard deviation of daily market returns within a month ($MRET_{STD}$). During time periods when investors face severe information asymmetry, issuers might find fewer investors are interested in new issues because they face the lemon's problem. Thus, issuers should avoid those periods.

We find that in Panel A two proxies ($IBES_{STD}$ and $MRET_{STD}$) show the expected negative signs but only the standard deviation of daily market returns with estimated coefficient of -11.14 and t-value of -2.96 is significant at one percent level. $IBES_{STD}$ is not significant and $ABRET_{STD}$ shows the wrong sign. Thus, IPO volume is significantly negatively affected by information asymmetry. In contrast, in Panel B for SEO volume, the average standard deviation of financial analysts' forecast shows positive sign, although the daily standard deviation of market returns is still significantly negative at one percent level. The adjusted R^2 is also higher for IPO equation (0.213) than for SEO equation (0.049). This is consistent with theories that seasoned firms have more asset-in-place and have disclosed information to the public for years, so seasoned firms might have less severe information problem than private firms going to the market for equity capital the first time.

Column 2 of table 5 tests the effect of future investment opportunities on IPO and SEO volume. We use three variables to proxy for future investment opportunities: the market-to-book ratio (MTB), the mean long term earnings growth rate made by financial analysts in a month ($IBES_{MEAN}$) and risk-free t-bill rate (R_F). In Panel A, the market-to-book ratio is significantly positively related to monthly IPO volume with an estimated coefficient of 0.192 and t-value of 9.96. This evidence suggests that more firms go public for new capital when currently equity valuation is high or investors are optimistic about future investment opportunities. But both of the estimated coefficients on the mean analysts' forecasts of long term earnings growth and the risk-free t-bill rate have the wrong signs. We find the same results in Panel B for SEO monthly volume as in Panel A. Only aggregate market-to-book ratio is significantly positively related to SEO volume. The adjusted R^2 is 0.402 for IPO volume equation and 0.043 for SEO volume equation. Both the estimated sign and significance and explanatory power show that IPO volume is more responsive to future investment opportunities. This might be true that more seasoned firms might have other financing channels other than issuing equity, but private firms might not have access to other means of finance for new projects.

Column 3 tests the investor sentiment hypothesis. The investor sentiment hypothesis predicts that firms should issue more equity when investors are more optimistic. We use two proxies here to test this sentiment hypothesis, one is the consumer sentiment index (SINDEX), and the other is future market returns. The market returns are one month ($MRET_{+1}$), three month ($MRET_{+1, +3}$), and one year ($MRET_{+1, +12}$) returns after each of the calendar months. We find that for IPO volume in Panel A, the estimated coefficient on consumer sentiment index is positive with a value of 0.002 and t-value of 1.72, which is significant at 10 percent level. The future one month future market return has a negative estimated coefficient, however, with a t-value of only -0.31, which is not significant at conventional level. The coefficient on three month future market return is positive with a t-value of only 0.12. However, the future one year market return has an estimated coefficient of -0.244 with a t-value of -3.76. This evidence, the significant positive sign on consumer sentiment index and negative sign on the future one year market return supports the sentiment hypothesis.

One would expect the SEO volume be less affected by investor sentiments. Panel B of table 5 show the results of the effect of investor sentiments on SEO volume. The estimated coefficient on SEO volume is negative, which is in sharp contrast to the positive effect on IPO volume. However, the one year future market return also has an expected negative sign with a value of -0.275 and t-value of -4.88. The adjusted R^2 is 0.189 for IPO volume equation and 0.151 for SEO volume equation. This evidence might suggest that both IPO and SEO volume are affected by investor sentiments, but more so for IPO volume.

Column 4 and 5 test the timing hypothesis which asserts that firms time the issuance of equity by selling equity shares when the valuation of equity is high. The testable hypothesis of this timing hypothesis is that the IPO and SEO volume should be positively related to past market performance and negatively related to future market performance. We use one month ($MRET_{-1}$), three month ($MRET_{-3,\,-1}$), and one year ($MRET_{-12,\,-1}$) past market returns. In column 4 we only use past and future market returns, while in column 5 we also control for market-to-book ratio.

Column 4 of Panel A confirms that private firms do have the timing ability. The coefficient on the one year past market returns is 0.327 with a t-value of 6.06 and the coefficient on the one year future market returns is -0.270 with a t-value of -4.98. The coefficients on one month and three month past and future market return are not significant at conventional levels. And column 5 shows that even after controlling for market-to-book ratio, the past one year returns still have the expected signs with high significance level. Although the one year future return still have the negative sign, it is no longer significant at conventional level. The market-to-book ratio increases the explanatory power significantly, the adjusted R^2 increased from 0.206 to 0.570.

Column 4 and 5 of Panel B show the results of the test of timing hypothesis for SEO volume. Whether we control for market-to-book ratio or not does not change the estimated coefficients on past and future market returns. In contrast to the results just discussed for IPO volume, none of the after market returns are significantly related to SEO volume although the future one year market return has the expected negative sign. However, now both the three month and one year past market returns are positively related to SEO volume. In column 4 and 5 of Panel A, the estimated coefficient on three month past market return is negative. This suggests that seasoned firms might have more timing ability to short run broad market performance.

In column 6 of table 5 we estimate a multivariate equation with all explanatory variables to test the relative explanatory power of different hypotheses. We also add a lagged IPO or SEO volume in IPO or SEO regression. In the IPO volume equation, after controlling for other variables, only three variables of interest to us remain significant with the expected signs. The market-to-book ratio has an estimated coefficient of 0.088

with a t-value of 3.27, the concurrent market volatility an estimated coefficient of -10.71 with a t-value of -3.74, and one year past market return an estimated coefficient of 0.280 with a t-value of 4.26. None of the other variables is significant at conventional level. Thus, we still find that the IPO volume can be explained by investment opportunity hypothesis, information asymmetry and timing hypotheses, but not the sentiment hypothesis. Our evidence is in contrast to that presented in Lowry (2003) regarding investor sentiment hypothesis. This difference might be attributed to two factors. One is that Lowry uses closed-end fund discount as a proxy for investor sentiments, and the other is that she uses quarterly IPO volume but we use monthly here.

Column 6 of Panel B shows the results of multivariate regression of SEO volume. We find that for SEOs, the only hypothesis that receives empirical support is timing hypothesis. Only three variables have the expected signs and are significant at conventional level, namely the concurrent market return, the past three month market return and the past one year market return. However, after controlling for market returns, the market-to-book ratio is no longer significant.

To summarize, consistent with previous studies, we find that when testing different hypotheses separately IPO volume is affected by several economic factors, such as information asymmetry, investor sentiments and investment opportunities. However, SEO volume is not as strongly affected by investor sentiments. Both high IPO and SEO volume follow high market returns, but seasoned firms seem to have higher timing ability.

VI. Summary

We empirically examine the cycles of seasoned equity offerings and find the similar hot-and-cold markets over the last three decades and document several new findings. Using monthly number of SEOs as a measure of SEO volume, we find that there is significant variation in the monthly SEO volume but smaller than the variation of monthly IPO volume. It appears that in certain time periods private firms simply cannot go public by issuing equity. However, seasoned firms issued equity in every month in the thirty years from 1973 to 2002. Although the SEO market also shows the same cycles, but the cycles of SEOs are shorter than those of IPOs. The autocorrelations of SEO monthly volume are only significant for the first eight lags; however, for IPOs, they are significant up to the 12th lag.

We also try to discern whether there exist a lead/lag relation between IPO and SEO volume by using a third order vector-autoregression analysis. We find that the lagged IPO volume collectively affect SEO volume and lagged SEO volume also collectively affect IPO volume. However, the lagged IPO volume is positively related to the SEO volume, which means high IPO volume causes high SEO volume; but the lagged SEO volume is negatively related to IPO volume, which means after the SEO market gets hot, the IPO market turns cold or normal.

We further test whether some economic and non-economic factors affect IPO and SEO cycles differentially. These factors are suggested by four hypotheses: information asymmetry, investor sentiments, future investment opportunities, and timing. When we test each of the hypotheses separately we find that all the hypotheses, information asymmetry, investor sentiments, future investment opportunities, and timing, can explain

IPO cycles, but to varying degrees. When we examine all the hypotheses in one regression, we still find support for asymmetric information, future investment opportunities and timing hypotheses. However, when tested separately, all the hypotheses can only explain less of the variation of the SEO cycles than IPO cycles. In the multiple regression for SEO cycles, the only hypothesis receives empirical support is timing hypothesis. SEO volume is significantly related to past and current market returns. Our evidence is in general consistent with previous studies and provides strong support for timing hypotheses for both IPOs and SEOs.

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Table 1
Sample Description

This table shows the sample characteristics. N_{IPO} (N_{SEO}) denotes number of IPOs (SEOs) in a month from January 1970 to December 2002. $N_{IPO, \%}$ ($N_{SEO, \%}$) denotes number of IPOs (SEOs) as percentage of number of total public firm in a month from January 1970 to December 2002. MTB is the average market-to-book ratio of all firms available on CRSP and Compustat in a month. $IBES_{MEAN}$ is the average analysts' forecast of long term earning growth for all firms made in a month. $IBES_{STD}$ is the average of standard deviations of analysts' forecast of long term earning growth for all firms made in a month. R_F is the one year T-bill rate in a given month. SINDEX is the consumer confidence index published by The Conference Board Inc. $ABRET_{STD}$ is the standard deviation of abnormal returns around earnings announcements across all firms made earnings announcements in a month. MRET is the market return for an issuing month and $MRET_{STD}$ is the standard deviation of daily market returns during that month. $MRET_{-1}$, $MRET_{-3,-1}$, and $MRET_{-12,-1}$ are one month, three month and one year market return prior to an issuing month. $MRET_{+1}$, $MRET_{+1,+3}$, and $MRET_{+1,+12}$ are one month, three month and one year market returns after an issuing month. EXPANSION is a business cycle indicator variable with a value of 1 if NBER defines a month is in an expansionary phase of a business cycle, and 0 otherwise.

Variable	Mean	Median	STD	Min	Max	OBS
N_{IPO}	18.66	13	18.14	0	83	360
N_{SEO}	19.17	17	11.97	1	73	360
$N_{IPO, \%}$	0.257	0.198	0.235	0	1.050	360
$N_{SEO, \%}$	0.293	0.255	0.187	0.014	1.277	360
MTB	3.24	3.21	1.06	1.12	5.97	360
$IBES_{MEAN}$	0.172	0.165	0.025	0.142	0.238	253
$IBES_{STD}$	0.042	0.038	0.008	0.032	0.063	253
R_F	0.072	0.066	0.029	0.015	0.167	360
SINDEX	87.83	91.05	12.92	51.70	112.00	300
$ABRET_{STD}$	0.082	0.077	0.025	0.041	0.219	360
MRET	0.012	0.015	0.059	-0.272	0.299	360
$MRET_{STD}$	0.006	0.005	0.004	0.002	0.039	360
$MRET_{-1}$	0.012	0.015	0.059	-0.272	0.299	360
$MRET_{-3,-1}$	0.037	0.035	0.114	-0.320	0.481	360
$MRET_{-12,-1}$	0.155	0.170	0.237	-0.385	1.071	360
$MRET_{+1}$	0.012	0.0148	0.059	-0.272	0.299	360
$MRET_{+1,+3}$	0.038	0.036	0.114	-0.320	0.481	360
$MRET_{+1,+12}$	0.172	0.179	0.235	-0.385	1.071	360
EXPANSION	0.85	1	0.36	0	1	360

Table 2
The Number of Hot and Cold IPO and SEO Months from 1973 to 2002

All the months from 1973 to 2002 are divided into three different market conditions: hot, normal and cold. If the number of IPOs (SEOs) in any month is less than 5 then that month is denoted as a cold month. If the number of IPOs (SEOs) in any month is more than 30 then that month is denoted as a hot month. All other months with number of IPOs (SEOs) between 5 and 30 are coded as normal months.

	IPOs		SEOs	
Market Condition	Number	Percent (%)	Number	Percent (%)
Cold	122	33.89	28	7.78
Normal	145	40.28	271	75.28
Hot	93	25.83	61	16.94
Total	360	100.00	360	100.00

Table 3
Autocorrelation Analysis of IPO and SEO Volume

This table shows the autocorrelations of monthly number of IPOs and monthly number of SEOs up to 12th lag. For any month, if there is no IPO of SEO in that month, then the number of IPOs or SEOs for that month is set to zero. The numbers of IPOs and SEOs are scaled by the total number of public firms at the end of previous month.

	$N_{IPO, \%}$		$N_{SEO, \%}$	
Lags	Corr.	Std	Corr.	Std
1	0.820	0.053	0.741	0.053
2	0.745	0.081	0.615	0.076
3	0.710	0.098	0.547	0.089
4	0.697	0.111	0.479	0.098
5	0.659	0.123	0.413	0.104
6	0.602	0.132	0.382	0.109
7	0.547	0.140	0.296	0.112
8	0.503	0.146	0.217	0.114
9	0.474	0.150	0.154	0.116
10	0.409	0.154	0.123	0.116
11	0.396	0.157	0.118	0.117
12	0.410	0.160	0.137	0.117
OBS (T)	360		360	

Table 4
The Relation between Monthly Number IPOs and Monthly Number of SEOs

This table shows the results of a sixth order vector-autoregression (VAR) model testing the causal relation between the monthly number of IPOs and monthly number of SEOs. The Granger F-test tests whether all the lags of one variable collectively are significant in explaining another variable.

Dependent Variable	N_{IPO}		N_{SEO}	
	Coeff.	t-stat	Coeff.	t-stat
Constant	0.282	6.12	0.302	12.15
$N_{IPO\ t-1}$	0.421	7.36	0.257	4.21
$N_{IPO\ t-2}$	0.113	1.83	-0.023	-0.33
$N_{IPO\ t-3}$	0.079	1.26	-0.005	-0.07
$N_{IPO\ t-4}$	0.181	2.89	0.002	0.02
$N_{IPO\ t-5}$	0.017	0.27	-0.002	-0.02
$N_{IPO\ t-6}$	-0.005	-0.09	0.085	1.38
$N_{SEO\ t-1}$	0.052	0.98	0.572	10.04
$N_{SEO\ t-2}$	-0.180	-3.13	0.156	2.42
$N_{SEO\ t-3}$	0.035	0.60	0.078	1.20
$N_{SEO\ t-4}$	0.078	1.34	0.0125	0.19
$N_{SEO\ t-5}$	-0.118	-2.04	-0.008	-0.13
$N_{SEO\ t-6}$	0.042	0.80	0.101	1.77
OBS (T)	360		360	
Adj. R^2	0.73		0.58	
Granger F-test:				
Number of IPOs			14.92	
Number of SEOs	31.58			

Table 5
Multivariate Analysis of IPO and SEO Volumes

This table shows the results of multiple OLS regression analysis of IPO and SEO volumes. The dependent variables are monthly number of IPOs and SEOs scaled by the number of public firms at the end of previous month. All the other variables are defined in Table 1. Panel A shows the results of multivariate analysis with the scaled monthly number of IPOs as dependent variable, and Panel B shows the results of multivariate analysis with the scaled monthly number of SEOs as dependent variable.

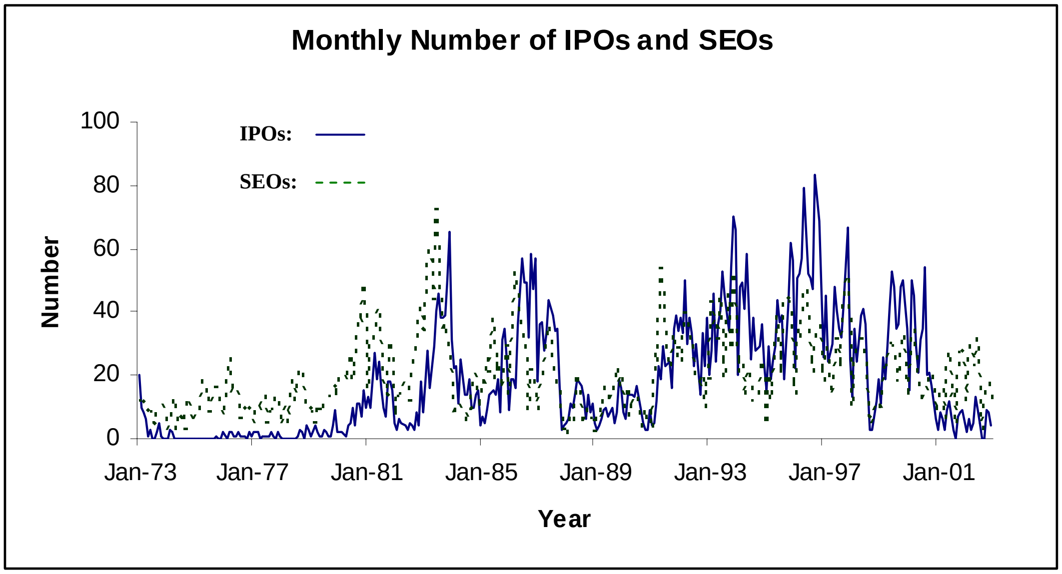
Panel A IPO Volume

Variables	1		2		3		4		5		6	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
Intercept	0.302	3.52	0.008	0.07	0.086	0.88	0.273	15.18	-0.236	-7.32	0.078	0.64
$LagN_{IPO}$											0.441	8.01
MTB			0.192	9.96					0.146	17.27	0.088	3.27
$IBES_{MEAN}$			-0.029	-5.38							-0.011	-1.07
$IBES_{STD}$	-0.027	-1.46									0.017	0.63
R_F			0.519	1.03							-0.278	-0.59
$ABRET_{STD}$	0.176	0.31									-0.385	-0.80
MRET											-0.144	-0.71
$MRET_{STD}$	-11.141	-2.96									-10.710	-3.74
$MRET_{-1}$							0.084	0.35	0.004	0.02	0.136	0.66
$MRET_{-3,-1}$							-0.108	-0.83	-0.135	-1.40	-0.110	-0.97
$MRET_{-12,-1}$							0.327	6.06	0.311	7.84	0.280	4.26
$MRET_{+1}$					-0.086	-0.31	0.013	0.06	-0.012	-0.07	-0.006	-0.03
$MRET_{+1,+3}$					0.018	0.12	-0.015	-0.11	0.023	0.24	0.104	0.96
$MRET_{+1,+12}$					-0.244	-3.76	-0.270	-4.98	-0.024	-0.55	0.047	0.83
SINDEX					0.002	1.72					-0.000	-0.22
EXPANSION	0.247	5.93	0.116	2.90	0.125	2.94					0.017	0.40
QTR1	-0.098	-3.28	-0.117	-4.49	-0.090	-3.24	-0.067	-2.54	-0.072	-3.73	-0.075	-3.54
OBS	253		253		300		360		360		253	
Adj. R^2	0.213		0.402		0.189		0.206		0.570		0.664	
F-Value	14.66		34.84		12.63		14.33		60.43		30.26	

Panel B SEO Volume

Variables	1		2		3		4		5		6	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
Intercept	0.190	2.43	0.366	3.00	0.867	10.26	0.242	19.56	0.174	5.79	0.209	1.97
$LagN_{SEO}$											0.397	6.75
MTB			0.054	2.66					0.020	2.50	0.002	0.10
$IBES_{MEAN}$			-0.017	-2.96							-0.008	-0.88
$IBES_{STD}$	0.046	2.75									0.035	1.57
R_F			0.349	0.66							0.272	0.69
$ABRET_{STD}$	-0.693	-1.32									0.372	0.92
MRET											0.367	2.14
$MRET_{STD}$	-9.801	-2.85									-3.780	-1.57
$MRET_{-1}$							0.061	0.37	0.050	0.31	0.126	0.72
$MRET_{-3,-1}$							0.461	5.12	0.457	5.12	0.431	4.30
$MRET_{-12,-1}$							0.345	9.26	0.342	9.27	0.264	4.47
$MRET_{+1}$					-0.057	-0.24	0.019	0.12	0.016	0.10	-0.096	-0.56
$MRET_{+1,+3}$					0.026	0.20	0.104	1.14	0.109	1.20	0.121	1.33
$MRET_{+1,+12}$					-0.275	-4.88	-0.046	-1.24	-0.013	-0.34	0.057	1.20
SINDEX					-0.006	-6.51					-0.001	-1.15
EXPANSION	0.053	1.39	0.013	0.31	0.071	1.94					-0.005	-0.14
QTR1	-0.049	-1.79	-0.050	-1.82	-0.052	-2.17	-0.067	-3.70	-0.068	-3.77	-0.045	-2.49
OBS	253		253		300		360		360		253	
Adj. R^2	0.049		0.043		0.151		0.402		0.411		0.6570	
F-Value	3.60		3.28		9.83		35.43		32.25		29.40	

Figure 1
Monthly Number of IPOs and SEOs from January 1973 to December 2002



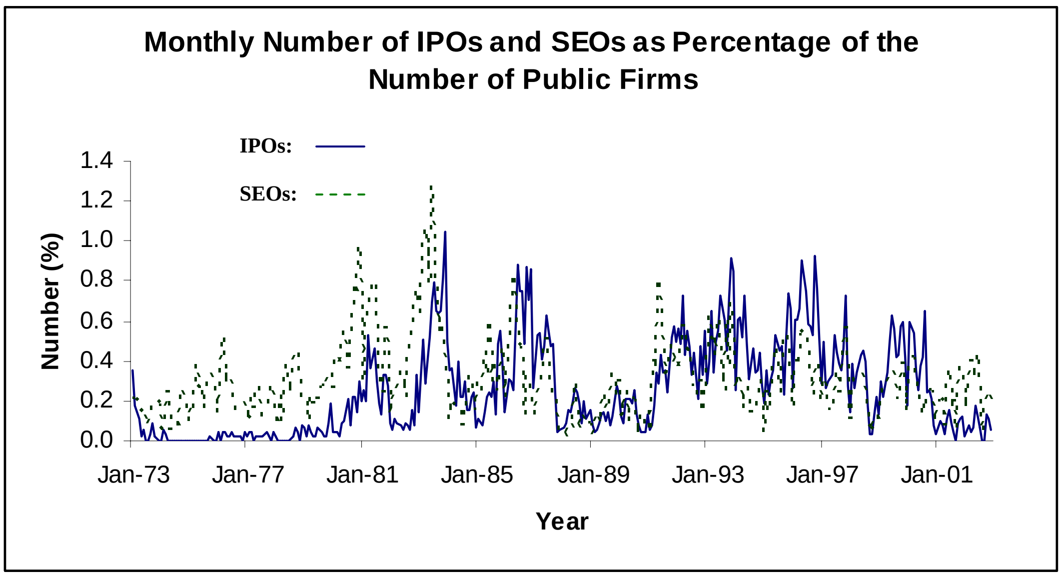
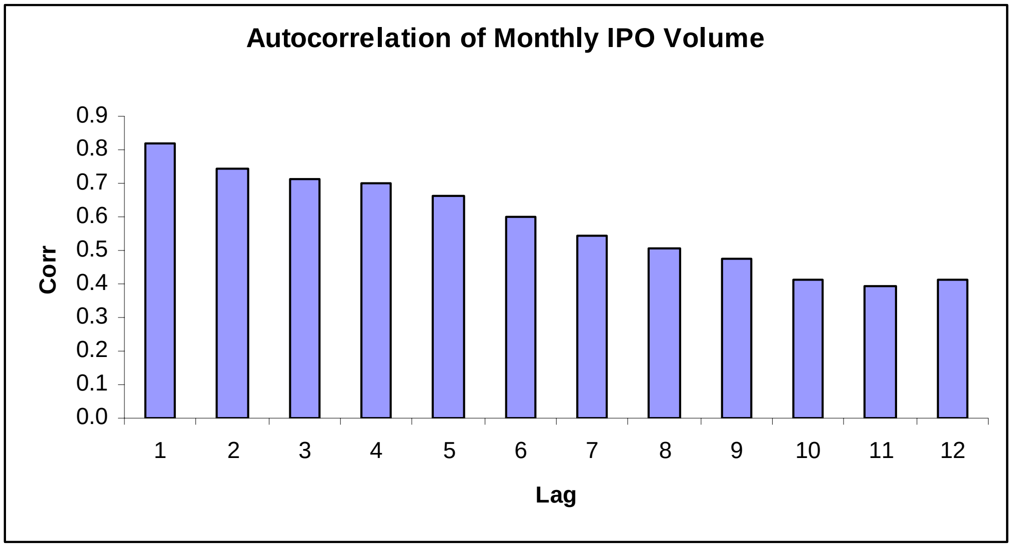


Figure 2
Autocorrelations of IPO and SEO Volumes from 1973 to 2002



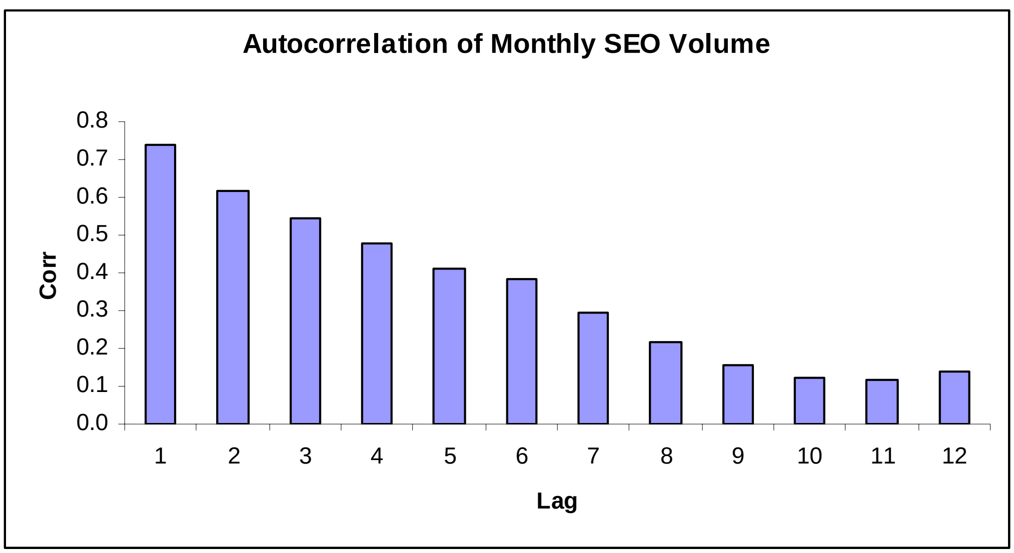


Figure 3
Cross-correlations between IPO and SEO Volumes from 1973 to 2002