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Boom and Slump Periods in the Indian IPO Market

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This paper attempts a detailed investigation of the boom and slump phases in the Indian primary capital market. It concentrates on two key variables, namely, IPO volume and initial returns and analyses their nature and interrelation during these two periods. This study also analyses the firm-specific characteristics and their influence on the timing of a company getting listed in the hot and cold market. The IPO volume series was autocorrelated over the entire period and especially during the boom period. This shows a firm's decision to go public over the last decade depended on the number of other companies that were getting listed over the previous months. Turning to the interrelation of volume and initial return, the empirical exercise (Granger causality test) found no significant relation between IPO volume and initial returns during the hot and cold periods. This suggests that over the sample period, the Indian issuers' did not depend on the information content of the initial returns while taking their decision to go public. Amongst the other characteristics that might have influenced the likelihood of IPOs during hot and cold market (*e.g.* industry classification, age, size and underpricing of new issues), this paper finds no significant influence of industry affiliation on the IPOs during the boom period. The results also documented that more established firms have greater likelihood to get listed on the capital market to raise large amounts and underprice more during the slump period.

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Introduction

It has been empirically documented that the IPO market experiences cycles in terms of volumes of new companies, which is referred to in the literature as “hot” and “cold” periods. It is considered to be an empirical anomaly for which no unanimous explanation is yet provided for. The most well known among the sighted explanations is technological innovation or positive productivity shock that changes the prospects of IPOs from a

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particular industry. Empirical studies have found that small and young firms time their offers to use investors' optimism in their favour and get listed during the booming period. There are evidences of high underpricing[1] and industry clustering during the hot periods, though their nature and extent have differed from country to country.

Only four countries in the world (namely U.S.A., India, Romania and Canada)[2] have more than three thousand listed companies in their stock exchanges. In India, during 1990s alone, 3,537 companies got listed on the Bombay Stock Exchange (BSE). The last decade is also important, since the Indian economy in general and primary capital market, in particular, has undergone remarkable changes during this period. The liberalisation programme initiated in 1992 along with other changes have enabled large Foreign Direct Investment (FDI) and Foreign Institutional Investment (FII) inflows, giving a 'big push' to the capital market. The abolition of the Controller of Capital Issues (CCI) also had a major impact on the activities in the Indian primary market. It witnessed a boom phase (1993-96) when more than 50 companies got listed every month. However, from end 1996 till recently the primary market has witnessed a considerable decline in the number of new issues and the total amount of capital raised.

This paper attempts a detailed investigation of the boom and slump phases in the Indian primary market. It concentrates on two key variables, namely IPO volume and initial returns series and analyses their nature and interrelation during these two phases. This study also analyses the firm-specific characteristics (*i.e.,* age, industry type, size) and their influence on the timing of a company getting listed during high volume period as compared to low volume period.

The remainder of the paper is organised as follows. Section I contains a survey of international literature. Section II outlines the data sources for this study and Section III discusses the methodology used and presents the results. Section IV summarises the main findings with some concluding remarks.

Section I
Literature Survey

Ibbotson and Jaffe (1975) were the first to document the existence of the "hot issue market". Since then a large number of academic studies have concentrated on the cyclical nature of IPO market. While different authors have used different definitions of hot market (IPO volume, initial return, market adjusted initial return), the financial community has been unanimous about the existence of cycles with dramatic swings in the new issue market. The dramatic swings refer to the fact that often the periods of high volume and high initial return are followed by periods when the number of issues and the high initial returns completely die down. Besides the existence of dramatic swings, empirical literature has also documented the presence of autocorrelation in IPO volume series, underpricing series along with lead-lag relation between these two series [Ibbotson and Jaffe (1975), Ritter (1984), Ibbotson, Sindelar and Ritter (1988, 1994), Lowry and Schwert (2002)]. While economists are unanimous about the existence of hot and cold markets, there remain some differences in the underlying explanations provided by them.

Theoretically, a firm's objective is to collect as much money as possible from the investors for a given quantum of shares offered and thus firms are expected to go public when initial returns are low. The empirically established positive relation between initial return and IPO-volume poses a puzzle and underlines the signalling role (or information content) of initial return series. Ritter (1984) justified this phenomenon as an equilibrium relation between risk and initial return. He argued that during hot issue market a large number of firms come from high-risk industries and as a consequence the initial return goes up. Explaining why a large number of firms would get listed in a particular period of time, Ritter (1984) argued that this might be in reaction to a technological innovation or a positive productivity shock that might have convinced the investors about the high profitability of a particular sector. On a similar line, Hoffmann-Burchardi (2001) argued that a hot issue market typically arises from bunching of IPOs and activities in few industries. Both IPO clustering and underpricing, according to Hoffmann-Burchardi (2001), are the result of positive surprise about industry prospects.

While the above mentioned literature suggests concentration of IPOs during the hot periods and change in the firms' characteristics during hot and cold markets, Helwege and Liang (2001) found that the IPOs in hot and cold periods came from similar industries and had similar characteristics. The authors claimed that this result does not contradict the idea of IPOs clustering into new products and industries during different market conditions.

Another explanation of the large volumes and large initial returns during the hot market is based on Allen and Faulhaber's (1989) IPO signalling model. The signalling theory predicts that following a technological and productivity shock, a large number of good companies will come to the market during the hot period. They will underprice their issues to gain investors' confidence and to prove their better quality to the investors.

While the signalling model appears convincing, there exists an antithesis to it. It is well documented in the literature that there remains an information gap between the investors and the issuers at the time of offering and there are periods when enthusiastic investors overvalue the newly listed companies. The IPO literature has frequently emphasised the role of investors' optimism and the consequent hot market. Ritter (1984) provided empirical evidence of investors' over-optimism in bidding up the aftermarket prices. Empirical literature [Ritter (1991), Jain and Kini (1994), Ibbotson, Sindelar and Ritter (1988 and 1994), Lowry and Schwert (2002), Helwege and Liang, (2001)] has documented that the underperformance is more for small and young companies that mostly go public during the hot market period.

Companies planning to go public try to predict the investors' sentiment on the basis of market behaviour. Lowry and Schwert (2002) using third order VAR models and the Granger causality tests found positive relation between average initial return and subsequent IPO volume. The authors argued that the initial returns might be interpreted by the potential issuers and investment bankers as an indicator of investors' optimism and hence this might explain the observed lagged relation between initial return and volume of IPOs. Ibbotson, Sindelar and Ritter (1994) argued that investors' follow a positive feedback

strategy. This theory says that the investors are willing to bid up the price of an issue if another recent issue has risen in price. If a large fraction of investors follow this logic, then it generates a positive autocorrelation among IPOs in a self-fulfilling prophecy.

Against the above backdrop, the objective of this paper is to study the hot and cold phases in the Indian IPO market and to analyse the factors that influenced the volume, underpricing and timing of issues during these two phases. In particular, this paper addresses the following questions:

1. Is there any time pattern evident in the IPO volume and the underpricing series observed during the 1990s? Are the two series affected by their past behaviour?
2. Does the initial return series convey any information that affects the volume of subsequent IPOs? In other words, did the issuers in India time their IPOs in response to the information content of initial return series?
3. Whether the firm-specific characteristics have a role in influencing the decision of firms getting listed during the hot and cold phases?

Section II

Data

The main data sources for the present analysis are the Monthly Reviews published by the Centre for Monitoring Indian Economy (CMIE) and the Prowess Dataset. The monthly reviews contain information on companies' name, issue date, listing date, issue price, listing price and the issue amount. A large number of new companies got listed on the Bombay Stock Exchange (BSE) during the last decade. Before May 1992, the Controller of Capital Issues (CCI) used to determine the issue amount and offer price of the IPO companies. After the abolition of the CCI, the new Securities and Exchange Baord of India (SEBI) guidelines gave considerable freedom in terms of deciding the issue price, issue amount and a large number of IPO got listed in the subsequent years. This analysis is based on 1842 IPOs

that got listed in the post CCI period[3] (between January 1993 and March, 2001) on the Bombay Stock Exchange (BSE) and information on these companies is available on Prowess dataset. Before discussing the trends in the Indian primary market in more detail, an explanation of the different variables used in this analysis is set out :

'Initial return' or 'underpricing' (U_D) is defined as the percentage difference between the listing price (closing price of first day's trading) and offer price. The monthly average underpricing gives the average of all the companies, which got listed in that particular month. IPO volume represents the number of companies that got listed in a particular month on the BSE. The variable 'Issue Amount' (IA) or SIZE reports the total amount of money collected by the issuer from the investors through the IPO. The value of money has changed substantially over the period under consideration. This calls for the adjustment in the issue amount and implicit GDP deflator is used to convert the same at constant prices. In India, over the sample period, the offer to listing lag was long and varied considerably among the issues. Because of the long time lapse, the use of market index adjusted initial return has often been suggested, rather than initial return, as a preferable measure of underpricing in India (Shah, 1995). The variable A_UD reports the underpricing after adjusting for the BSE Sensex returns over the issue-listing period.

Section III
Empirical Findings

Table 1 reports the average of the key variables over the entire 1990s. It shows that the average amount raised over the years has increased in the second half of 1990s. The number of new issues that got listed on the BSE went up considerably during 1993-96. These three years were followed by a slump when the number of IPOs went down substantially.

As mentioned earlier, for the empirical analysis, this study considered the post CCI period (1993 onwards). Following Loughran and Ritter (1995) and Helwege and Liang (2001), the analysis classifies the market as "hot" or "cold" on the basis of the IPO volume. A close inspection of the monthly volume of IPOs shows that there

Table 1: Averages of Key Variables for Indian IPOs

Year	SIZE (Rs. crore)	U_D	A_UD	Volume
1	2	3	4	5
1991-2	9.89	300.72	270.85	8
1992-3	14.01	237.25	221.42	15
1993-4	8.88	81.58	70.54	50
1994-5	9.24	100.26	100.52	81
1995-6	11.30	41.45	42.15	86
1996-7	9.68	38.60	38.43	42
1997-8	41.39	87.54	82.58	3
1998-9	18.54	85.43	85.31	2
1999-0	29.71	537.73	519.92	4
2000-1	22.11	103.56	104.52	6

Size : Money raised by the issuers from public at constant prices;

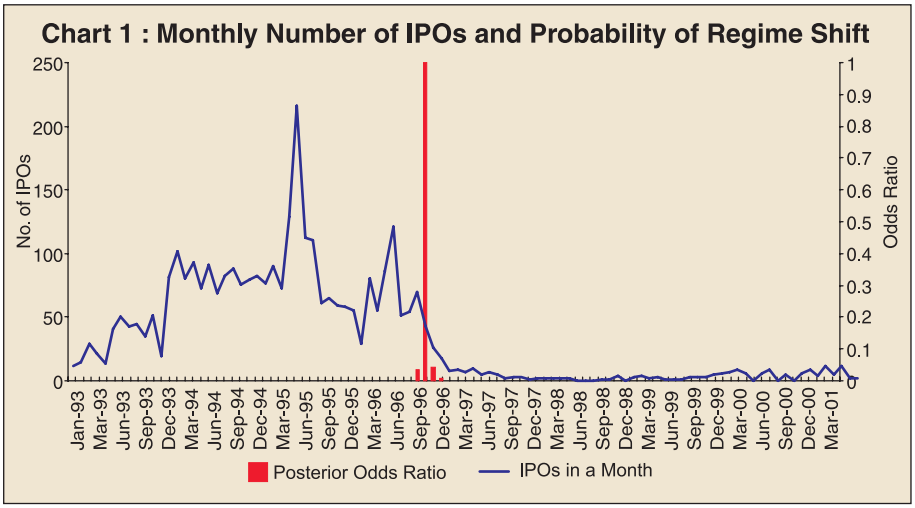
Underpricing (U_D) : percentage difference between listing and offer price.

A_UD : Underpricing adjusted for the market return over the issue-listing period;

Volume: The average of the 'number of IPOs getting listed on BSE in a month' over the financial years considered here.

Note : All averages reported in the Table are significantly different from zero at 1 per cent level.

were two distinct phases in 1990s. Empirically the timing of this structural break has also been confirmed by the Markov Switching process. Chart 1 shows the number of IPOs over the months and the probability of the structural break (switching regression model) in the Indian primary market. There was a boom phase when (on average) more than fifty IPOs got listed on BSE per month (1993:01



to 1996:09) and subsequently a slump when only a handful of companies raised money from the stock market.

It is evident from the literature survey that the IPO volume and the underpricing series follow a certain time pattern. The periods of large number of IPOs and the high initial return are followed by periods when only a handful of companies get listed in the market. Empirical evidence suggests that the firms' decision to go public could also depend on the behaviour/decision of the other companies and on the observed initial returns. The decision to get listed and its timing are also found to depend on firm-specific characteristics (e.g. industry affiliation, size of the issue, age).

Having identified the boom and slump periods, and in light of the above observations, the subsequent sections of this paper analyse the pattern and characteristics of the key variables over different phases in the Indian IPOs market.

Time Pattern of IPO Volume and Initial Returns

In this section we analyse the IPO volume and underpricing series individually taking into account different phases in the Indian IPO market during 1993-2001. Lowry and Schwert (2002) argued that the fluctuation in IPO volume series could be related to three factors. These are changes in private firms aggregate demand for capital, changes in cost of issuing equity (underpricing) and variation in investor optimism. In face of cyclical pattern in the IPO market, empirical evidence from the developed countries suggests that the volume and underpricing series depend considerably on their past behaviour. Table-2 reports the autocorrelation in the monthly volume, underpricing and index adjusted underpricing series for the Indian IPO market.

Empirical results show that the monthly volume of IPOs has a large autocorrelation (first lag coefficient being 0.62) that dampens slowly over the increasing lags. However, the other two series, namely, underpricing (U_D) and market adjusted underpricing (A_UD) did not show signs of any strong autocorrelation or uniform damping pattern over the sampling period. The inertia or time dependence is indicative of the

Table 2: Autocorrelation in Volume and Underpricing Series in Different Periods

	Whole Period			Hot Phase			Cold Phase		
Lag	**U_D**	**A_UD**	**Vol**	**U_D**	**A_UD**	**Vol**	**U_D**	**A_UD**	**Vol**
1	0.17	0.14	0.62	0.54	0.55	0.86	0.06	0.05	0.33
2	0.22	0.20	0.46	0.33	0.38	0.80	0.16	0.15	0.46
3	0.13	0.12	0.36	0.26	0.30	0.76	0.06	0.05	0.29
4	0.12	0.10	0.22	0.14	0.18	0.70	0.04	0.03	0.14
5	0.26	0.25	0.19	0.14	0.17	0.69	0.21	0.21	0.23
6	0.05	0.03	0.11	0.05	0.01	0.65	-0.04	-0.04	-0.13

Note : Underpricing (U_D) is the percentage difference of listing and offer price; Underpricing adjusted for the market return over the issue-listing period (A_UD); Here U_D and A_UD are equally weighted averages over the months. Vol: No. of IPOs getting listed on BSE in a particular month.Whole period (Jan 93 to Mar 2001); Hot Period (Jan 1993 to Sep 1996)–more than fifty IPOs in a month,Cold Period (Oct 1996 to March 2001)–less than fifty IPOs in a month.

information content of the IPO volume (number of IPOs in a month) which could have signalled the issuers about the buoyant market conditions or the new profit prospects.

From Table 2, the differences in the pattern of the autocorrelation coefficients over different phases become quite evident. For the boom period, the coefficients display a high initial autocorrelation coefficient and a slower damping pattern over the lags while during the cold period, the same show a weak and mixed pattern. So, it appears that during the boom period, a company's decision to go public depended more on past IPO volume as compared to the slump periods. The above analysis suggests that the nature and pattern of autocorrelation over the entire period of time and over the sub periods differ considerably. The high autocorrelation in the monthly IPO volume during the hot market might be indicative of the investors' optimism resulting from the array of liberalisation measures announced during the first half of 1990s. The underpricing series also illustrated considerable autocorrelation and slow damping pattern over the increasing lags during the boom period. The similarity in the autocorrelation pattern of the IPO volume series and underpricing series might be indicative of one influencing the other during the hot market period as observed in the developed markets. We investigate the interrelation between the volume and underpricing series in greater detail below.

Interrelation of IPO Volume and Underpricing Series

Besides the observed autocorrelation, the other question that needs due attention is the relation between the IPO volume and underpricing. This is important since the existence of such a relation would imply that the issuers' time their offers in response to the 'value-relevant information' (Lowry and Schwert (2002)) available from the underpricing series and *vice-versa*.

For empirical investigation of the IPO volume and underpricing relation, following Lowry and Schwert (2002), this paper attempts Granger causality tests to examine the presence of any causal relation between IPO volume and past underpricing.

Granger causality test assumes that 'X causes Y' if the past values of X help in predicting Y in addition to past values of Y. The causality test is generally done by running regression of the following form:

$$Y_t = \sum_{i=1}^{m} \alpha_i Y_{t-1} + \sum_{i=1}^{m} \beta_i X_{t-1} + U_t$$

If the β_i coefficients ($\forall$ i=1,…m) are jointly and significantly different from zero (the F-test statistics is greater than its critical value) then the null hypothesis "X does not cause Y" is rejected. In order to determine the optimal lag length (m) this paper uses the Schwarz information criterion.

Before proceeding to test the causal relation between monthly volume of IPOs and the monthly average underpricing one must ensure that the two series considered are either stationary or have 'same statistical property'. By 'same statistical property' it is meant that the series have to be differenced or de-trended the same number of times to render them stationary. To test for the stationarity of the series, Augmented Dickey Fuller (ADF) test[4] was performed. The ADF test found the presence of unit root (at one per cent level) for the three series considered during the whole period and for the hot period. However, all the three series were stationary during the cold period. Perron (1993) has argued that the stationary property of a series runs into problem if the period considered consists of two sub-periods of different statistical property. So, for the causality test this

paper considers the hot and cold periods separately and not the entire period. To take care of the non-stationary problem during 1993-96, IPO volume and underpricing series were differenced[5] for the hot period. However, the series in levels were used for the cold phase.

Table 3 reports the coefficients and Granger-F statistics for volume and underpricing for the periods considered, the lags being selected on the basis of Schwarz information criterion as mentioned

Table 3: Causal Relation Between Volume and Underpricing

	Hot Phase					Cold Phase			
	U_D cause Vol		Vol cause U_D			U_D cause Vol		Vol cause U_D	
	Coeff	P-Val	Coeff	P-Val		Coeff	P-Val	Coeff	P-Val
1	2	3	4	5	6	7	8	9	10
U_D1{1}	0.08	0.53	-0.45	0.02	U_D{1}	0.002	0.13	0.14	0.43
U_D1{2}	0.11	0.42	-0.37	0.05	U_D{2}	-0.001	0.81	0.36	0.05
U_D1{3}	-0.09	0.53	-0.11	0.58	U_D{3}	-0.001	0.47	-0.13	0.47
U_D1{4}	-0.02	0.88	-0.15	0.42	U_D{4}			-0.21	0.25
U_D1{5}	0.03	0.76	-0.13	0.49	U_D{5}			0.22	0.15
U_D1{6}	0.01	0.97	-0.36	0.15	U_D{6}				
U_D1{7}	0.02	0.85	-0.04	0.81	U_D{7}				
U_D1{8}	0.02	0.81	0.08	0.45	U_D{8}				
U_D1{9}			0.06	0.51	U_D{9}				
VOL1{1}	-0.30	0.11	-0.08	0.75	VOL{1}	0.143	0.41	-39.93	0.18
VOL1{2}	-0.18	0.34	-0.21	0.43	VOL{2}	0.365	0.14	-29.38	0.34
VOL1{3}	-0.11	0.58	-0.20	0.46	VOL{3}	0.272	0.20	49.36	0.11
VOL1{4}	-0.31	0.13	0.11	0.68	VOL{4}			19.58	0.57
VOL1{5}	-0.09	0.65	0.04	0.89	VOL{5}			-32.94	0.19
VOL1{6}	-0.21	0.29	-0.05	0.86	VOL{6}				
VOL1{7}	-0.07	0.75	-0.10	0.73	VOL{7}				
VOL1{8}	-0.22	0.23	0.26	0.34	VOL{8}				
VOL1{9}			0.08	0.78	VOL{9}				
Const	0.99	0.70	-4.42	0.51	const	0.78	0.30	102.93	0.42
F-Stat	0.29	0.96	0.33	0.97		1.69	0.15	1.16	0.34

Note : Hot Period (Jan 1993 to Sep 1996): more than fifty IPOs in a month; Cold Period (Oct 1996 to March 2001): less than fifty IPOs in a month; Granger F test for causal relation of volume of IPO and initial returns and vice versa; Underpricing (U_D): percentage difference of listing and offer price; Vol: No. of IPOs getting listed on BSE in a particular month; and, Vol1 (volume) and U_D1 (Underpricing) reported here refer to the first differenced series vol and U_D for the hot market.

above. The coefficients of underpricing over different lags in the causality test (for whether underpricing caused the IPO volume) reported low values and none of them were significant at 10 per cent level (Table 3, Column 2 and 3). The value of the Granger F-Statistics (0.29) and its P-value (0.96) also confirm the joint insignificance of the estimated underpricing coefficients and reject the hypothesis that monthly IPO volume was Granger caused by past values of the underpricing series. The causality analysis for the cold period (that used the above mentioned variables in the levels) supported the finding for the hot period. The coefficients of underpricing (as indicated in Table 3, Column 7 and 8) took low values. These results reveal that the issuers' decision to go public during the boom and the slump periods did not depend on the past values of the underpricing series[6]. They also show that, unlike the international experience, the Indian issuers' decision to go public was not directly dependent on the information content (investors' optimism or the cost of raising funds) of underpricing series. This might be because, the time consumed by a company for getting listed in a stock exchange in India was very high over the study period. The average time lapsed in between the offer date and listing date being 4 months, the company deciding to go public was able to get listed only after six months (two months are considered for registration and other official formalities prior to the offer). Underpricing being the percentage difference of the offer price from the listing price (the former being decided six months before the latter) might have recorded the breaking news over this long time lag rather than the investors optimism *per se*. Given such an institutional structure, it might have created considerable uncertainty on the issuers' part to decide about the investors' sentiments and/or cost of raising funds after a considerable period of time from the observed underpricing.

We also test the existence of any reverse causality (underpricing is caused by IPO volume) in the Indian IPO market. Ritter (1984) argued that the underpricing might increase during the hot market period with the increases in the number of listing, since the hot market is often a result of technological innovation or positive productivity shock that increases the number of companies getting listed from new and high risk industries. The high risk factor pulls up the initial returns during

the hot periods. Empirical results for India reject this reverse causality hypothesis for both hot and cold periods (Table 3, columns 4 and 5, 9 and 10). These findings apparently question the hypothesis of positive technological shock resulting in industry clustering - an argument that is often forwarded to explain hot market. The industry clustering issues are discussed in more detail later.

The above empirical analysis might be summarised by saying that the issuers in India during the 1990s did not base their decision to go public on the past values of underpricing series. The boom during the first half of 1990s was perhaps a result of the investors' optimism and business conditions rather than the information content of the underpricing series. While the above analysis concentrated on the time pattern and the information content of the underpricing and IPO volume series, it remained silent about the firm-specific characteristics and their influence on the timing of a firm going public during hot and cold periods. The next sub-section is devoted to a detailed study of these factors influencing the companies' decision to go public during the hot and cold periods.

Firm-Specific Characteristics of IPOs during Hot and Cold Phases

In order to test as to how the firm-specific characteristics influence likelihood of listing across two periods, the analysis in this sub-section following Helwege and Liang (2001) examines the likelihood of an IPO in hot phase *vis-à-vis* a cold phase, conditional upon the companies that actually went public during these phases. This is done by employing a logit model where the dependent variable is a coding for a discrete qualitative outcome [e.g. whether a particular company is going public in high volume (hot phase, Y=1) or low volume (cold phase, Y=0)]. The general specification of the model is as follows:

Probability (Event 'j' occurs)= P (Y=j) = F (Relevant factors, Parameters) = F(x, β)

where the set of parameters β reflect the impact of changes in X on the probability. The logistic distribution used here is given by:

$$\Pr(y = 1) = \frac{e^{\beta x}}{1 + e^{\beta x}}$$

Like other non-linear distributions, the β coefficients do not represent the marginal effect of the change in a particular variable. The marginal effect in such case is given by

$$\frac{\partial E(y/x)}{\partial x} = \{\frac{\partial F(\beta \mathrm{x})}{\partial \beta \mathrm{x}}\}\beta = f(\beta \mathrm{x})\beta$$

where f(.) is the density function to the corresponding cumulative distribution F(.)[7].

In an attempt to examine whether the likelihood of IPOs getting listed from a particular industry is more during the hot period, all industries were broadly classified as Primary, Manufacturing (MNF), Services (SER) and computer related industry (SOFT) and were included as explanatory variables in the logit model. It is documented in the IPO literature that small and young companies are likely to go public during the hot period to take advantage of investors' enthusiasm. To examine the validity of this argument the issue amount (SIZE) and the age of the IPO companies are included in the model to evaluate their influence on the likelihood of the Indian companies getting listed in the hot market. The other factor of interest is the underpricing of the IPO firms. Signalling theory claims that the good firms would get listed during the hot market and underprice more to win investors confidence. The IPO underperformance school, on the other hand, believes that new firms would try to collect as much money as possible from the enthusiastic investors during the hot market. So, the above mentioned model includes underpricing as an explanatory variable and evaluates companies' pricing decision during the hot and cold periods. The constant term was not included in the model in order to avoid the dummy variable trap problem. The 'β' coefficient of the logit model estimated using maximum likelihood estimation technique is reported in the Table 4.

Table 4 shows that the primary, manufacturing and services sector considered here have similar positive coefficients. The value of the β-coefficient for the software sector is however considerably less (1.4) than that of other sectors. All the sector-specific coefficients were significant at one per cent level. This might be interpreted as the non-existence of industry clustering in India during hot market,

Table 4: Factors Influencing the Likelihood of IPOs During Hot and Cold Phases

	Coeff.	P-value	ME*
1	2	3	4
PRI	4.30	0.00	0.15
MNF	4.23	0.00	0.15
SER	3.08	0.00	0.11
SOFT	1.40	0.00	0.05
SIZE	-0.002	0.01	-0.0001
AGE	-0.04	0.00	-0.001
U_D	-0.15	0.00	-0.01

Note : *ME is Marginal Effect of the logit model

PRI is the dummy variable which takes value one if the company is from Primary Sector, otherwise zero. Similarly, MNF, SER and SOFT are the dummies for Manufacturing, Service and Software sector respectively. SIZE is issue amount adjusted by GDP deflator; U_D is Underpricing: percentage difference of listing and offer price[P_1-P_o/ P_o]; Age is the difference between the incorporation year and the listing year.

since companies from primary, manufacturing and service sector got listed in the market during this period. The β-coefficient for the software sector reported low value because this sector was just emerging during the hot period (1993-96) considered here. The marginal effect (ME) reported in Table 4 confirms this finding as the ME figure for the software sector was lower than the other three sectors. Table 4 however, shows that the coefficients of size, age, and underpricing have negative signs and were significant at 1 per cent level. The negative signs of the size, age and underpricing coefficients suggest that the large and well-established firms got listed in the cold period and underpricing was more. It might be because investors being less enthusiastic during the cold period, only the well-established firms could convince them about their prospective investments and raise funds through IPOs. It is generally believed that firms raising large amounts of money are scrutinised more by the market than their small size counterparts. So a larger size might have acted as a signal to the market and helped the issuers to raise more money during the cold period. The IPO firms during the cold period might have used underpricing as a signalling device (as suggested by the signalling theory) to persuade the investors about their good quality and raise large amounts of money from the market.

The results thus do not support the industry-clustering hypothesis explaining hot period for the Indian IPO market in 1990s. Firms from all the existing sectors of the economy took advantage of the booming primary market and investors' optimism and raised funds from investors in the first half of 1990s. The evidence presented in this paper suggests that the likelihood of established companies raising large amount from the primary market and underpricing considerably is more during the cold phase whereas the small and young companies time their issues during boom phase in the primary market.

Section IV
Conclusions

This paper attempted a detailed analysis of the Indian IPO market over the boom and slump phases. It documented that (like the developed market) the Indian IPO market experienced a dramatic swing in terms of volume of new IPOs. The IPO volume series was autocorrelated over the entire period and especially during the hot period. This shows a firm's decision to go public over the last decade depended on the number of other companies that were getting listed over the previous months. The autocorrelation in the underpricing series was weak as compared to the IPO volume series. Turning to the interrelation of volume and initial return, the empirical exercise (Granger causality test) found no significant relation between IPO volume and initial returns during the hot and cold period. This suggests that Indian issuers' did not depend on the information content of the initial returns while taking their decision to go public. A key reason for these findings could be that, unlike the developed countries, it took a long time (more than six months on an average) for Indian companies to get actually listed on the stock market after the promoters decided to go public. Underpricing derived from the price changes over the six months (or more) perhaps also captured the changing investors' expectation with the availability of new information rather than investors' optimism *per se.* So Indian corporate bodies might have depended more on long lasting market sentiments to decide on the timing of their IPOs.

Turning to the other characteristics that might have influenced the likelihood of IPOs during hot and cold market (*e.g.,* industry

classification, age, size and underpricing of new issues) the evidence in this paper suggests no significant influence of industry affiliation on the IPOs during the hot period. It is generally observed that hot market is triggered off by positive productivity shock in some sectors and companies from such sectors mostly go public during the hot period. However, the empirical exercise in this paper did not support the hypohesis that companies' from any particular sector timed their issues to take advantage of the hot phase in Indian primary market. The results also documented that more established firms came to the capital market to raise large amounts and underprice more to signal their better quality during the cold phase.

Notes

[1] The objective of the issuers and their investment bankers is to fetch maximum price per share conditional upon the intrinsic value of the shares. The risk is that the issue might get undersubscribed if it is perceived to be overpriced. The market price for an IPO is observed only on the listing day and the percentage difference of listing and offer price is defined as underpricing.

[2] The Emerging Stock Market Factbook.

[3] This study concentrated on companies that decided to go public after abolition of CCI. The post CCI period is considered from January 1993 (and not from May, 1992) since it took on average six months for a company to get listed in Indian stock market after it decided to do so. Four months is the average offer to listing time lag and two months considered for pre offer formalities.

[4] ADF test is given by

$$Y_t - Y_{t-1} = \alpha + \beta t + (\rho - 1)Y_{t-1} + \sum_{j=1}^{p} \lambda_j \Delta Y_{t-j} + \varepsilon_t$$

Here again the lag length 'p' is decided on the basis of Schwarz information criterion. The ADF test is considered for the null hypothesis $\gamma=(\rho-1)=0$, as against the alternative hypothesis $\gamma\neq0$. If the test accepts $\gamma=(\rho-1)=0$ on the basis of critical ADF values, then unit root is said to exist and the series considered to be non-stationary. The ADF test reported above is in the most generalized form. The incorporation of the intercept term (α) and the trend term (βt) in the equation are optional and might be decided on the basis of the graphical pattern that the series actually follows.

[5] The differenced series are found to be stationary.

[6] Since the time laps was long between the issue and offer date and market movement could influence underpricing, index adjusted underpricing (A_UD) was used in the causality analysis instead of raw underpricing. However, the results with this modified variable support the above findings.

[7] The appropriate marginal effect for a binary independent variable, say, d would be Pr[y=1(x*, d=1)]- Pr[y=1(x*, d=0)], where x* denotes the mean of all other variables in the model. Simply taking the derivative with respect to the binary variable as if it were continuous provides an approximation that is often surprisingly accurate. See Green (2000).

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