Group Affiliation and the Performance of Initial Public Offerings in the Indian Stock Market[1]

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ABSTRACT

We document the effects of group affiliation on the initial performance of 2,713 Initial Public Offerings (IPOs) in India under three regulatory regimes during the period 1990-2004. We distinguish between two competing hypotheses regarding group affiliation: the "certification" and the "tunneling" hypotheses. We lend support to the latter by showing that the underpricing of business group companies is *higher* than that of stand-alone companies. Furthermore, we find that the long run performance of IPOs, in general, is negative. We also find that Indian investors over-react to IPOs and their over-reaction (proxied by the oversubscription rate) explains the extent of underpricing.

I Introduction

The decision to go public through an Initial Public Offering (IPO) is one of the most critical decisions in the life cycle of a firm. Due to its presumed importance, it has become one of the most widely researched topics in the finance literature. One aspect of this literature is the use of some form of certification to reduce the costs associated with an IPO. To alleviate the costs associated with the IPO decision, firms often build their reputation by obtaining different types of quality certifications to signal their true value to the market. Some popular certification strategies include employing a reputable auditor (see Beatty, 1989), associating with a venture capitalist with an established track record (see Barry, Muscarella, Peavy and Vetsuypens (1990)), hiring a well-known underwriter (see Carter, Dark and Singh (1998)), attracting strong institutional affiliation (see Hamao, Packer and Ritter (2000)), and recruiting a good quality management team (see Chemmanur and Paeglis (2005)).[4]

One form of certification, popular in many countries where family-controlled businesses play a dominant role in the economy, is affiliation to a business group. For group companies, certification can also come in the form of being associated with a large multinational company (MNC), or a continuing link with the government after the privatization of a state-owned company. In this paper, we aim to address three main issues related to group affiliation and the initial and long term stock market performance of firms in the Indian context:

1. Does affiliation with a group, domestic , government or foreign, act as a form of certification at the time of the IPO, as reflected in its initial underpricing?

2. Does the long-run survival/success probability of such group-affiliated companies differ from that of stand-alone companies?

3. How do IPOs of firms that are affiliated to groups, domestic foreign or government, perform in the long run, in terms of returns to investors?

These questions arise in the context of the Indian economy, which provides a natural setting to examine various types of group affiliations. The Indian economy is dominated by family–controlled business groups. Khanna and Palepu (2000) argue that, in this context, business group

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[4] There is a vast literature on the role of certification in IPOs. We do not attempt to survey this literature in any detail here, but rather provide a few examples to set our research in context.

affiliation provides certification benefits in the absence of developed institutions in the product, labor and capital markets.

Using a sample of 2,713 Initial Public Offerings (IPOs) in India under three regulatory regimes during the period 1990-2004 we examine the performance of IPOs that are affiliated to business groups, foreign business groups, government affiliated firms, and standalone firms. We examine both the short run and long run performance of IPOs. Unlike other papers in this area, we also examine the longer term *survival* of firms making the IPOs. Longer term survival could be the decisive factor that separates group affiliated-firms from their stand-alones counterparts in an environment where institutional structures are somewhat weak.

We find that group-affiliated companies experienced greater underpricing than their stand-alone counterparts in their IPOs. Although this indicates that valuations of group firms exhibit the effects of higher information asymmetry, we find that even foreign group-affiliated firms that belong to better governed multi-national companies (MNCs) experience higher underpricing. These groups do not generally have complex cross holdings, and furthermore, are presumed to abide by more stringent disclosure norms.[5] We, therefore, extend our analysis to explore other alternative hypothesis for differential underpricing.

Using data on investor over-subscription, a proxy for investor overconfidence, we provide evidence that behavioral models may explain the higher underpricing of group firm IPOs better than traditional information asymmetry arguments. We find that the extent of oversubscription is positively correlated with the degree of underpricing. This clearly shows that the excess demand of investors, manifested by the extent of their oversubscription, is an important explanatory variable for the greater underpricing of group-affiliated firm IPOs.

We find that companies controlled by the government are the least underpriced, which is consistent with the cross-country study by Meggison, Nash, Netter and Schwartz (1999). On an *ex post* basis, we find that group-affiliated companies do not survive any better than stand-alone firms. The long-run stock market performance, in general, is negative for all IPOs.

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[5] However, as pointed out earlier, private foreign groups may have a conflict of interest between the Indian affiliate and the overseas parent, due to royalties and other transfer payments paid to the parent, which may partly explain our results.

To our knowledge, this is the second paper that addresses the *ex-ante* effects of group affiliation and the market's perception of firm value. The first was a paper by Dewenter, Novaes and Pettway (2001), which addressed the effects of group affiliation and the initial performance for the IPOs of Japanese firms affiliated with business groups. They conclude that group-affiliated companies pay higher costs in the form of higher IPO underpricing, due to the additional costs incurred by investors to analyze the complexity associated with group-affiliated companies.

Our study differs from that of Dewenter et al. (2001) in five respects. First, the institutional features, economic environment and the group structure vary significantly between India and Japan. Japanese business groups are generally not family-centric and tend to have a central financial firm, usually a bank, which provides a relatively efficient internal capital market. However, Indian business groups are predominately controlled by a few families in a legal environment that prohibits business groups from owning banks. Apart from this institutional difference, the financial markets in Japan are overall better developed compared to India, as noted by Khanna and Palepu (2000). Thus, the role of the internal capital market within a business group assumes much greater importance in the Indian context.

 Second, their sample includes only 159 IPOs that were issued in Japan between 1981 and 1994. Our study uses a more recent time period (1990-2004) and is based on a much larger sample size (2,713 IPOs). Third, apart from the IPOs of companies affiliated with domestic groups (as in the Dewenter et al., 2001 study), we also study those of companies affiliated with private foreign groups and the government. (This classification is not peculiar to India and is relevant in many other emerging market countries.)

Fourth, we examine, on an *ex post* basis, the performance of companies after the IPO. Our analysis casts some light on the subsequent evaluation of group affiliation well after the IPO, and presents a more complete picture of changing market perceptions over time. Last, but not least, as an alternative explanation to the one proposed by Dewenter et al. (2001), for greater underpricing of group-affiliated firms, we propose and test the over-reaction hypothesis in the context of IPOs. We argue that the opacity of the IPO process may not be the explanation for this phenomenon in the Indian context; rather, it is investors' interest in the new issues of group-affiliated firms that drives higher underpricing of the group affiliated firm IPOs compared to their stand-alone counterparts.

This paper is divided into five sections. The introduction in this section is followed by a brief review of group affiliation and firm performance literature and related hypotheses in section II.[6] A short description of the Indian primary market is also provided in the same section. The description of the data used for this study and the related statistics are presented in section III. Section IV discusses our empirical results. Concluding remarks are presented in section V.

II Literature Review

A. Group affiliation and firm performance

The relationship between group affiliation and firm performance has been well documented in the finance, strategy and industrial organization literatures. The broad consensus is that the specific institutional context of the economy plays an important role in determining the merits and demerits of group affiliation. The evidence, so far, suggests that in an environment with a relatively strong institutional infrastructure, enterprises engaged in multiple businesses under-perform relative to those that are focused on specific industries (excluding leveraged buy out (LBO) deals) (see, for example, Comment and Jarrell (1995), Berger and Ofek (1995) and Shin and Stulz (1998)).

In contrast, in an environment with a relatively weak institutional infrastructure, companies that belong to large, highly diversified groups tend to outperform stand-alone companies. Firms in markets with a poor institutional infrastructure incur higher costs to acquire finance, technology and managerial talent. Group affiliation reduces these costs due to economies of scope and scale, and results in better performance.[7] On the other hand, if these necessary inputs for the growth of firms are easily available in the marketplace, the positive group effect may disappear. In such cases, group affiliation could be expensive, due to a lack of focus in one particular activity, resulting in underperformance of group-affiliated companies when compared to their stand-alone counterparts. This conclusion would be in line with the

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[6] To keep the paper more focused, our discussion of the IPO literature is mainly restricted to papers that are related to the certification hypothesis.

[7] See, for example, Khanna and Palepu (2000), who relate these differences in the performance of companies to the "substitution" mechanism provided by groups.

"conglomerate discount" hypothesis regarding the industrialized countries, primarily the United States. Given that we are dealing with three different types of groups, namely, domestic Indian, foreign and government groups, we treat them separately and propose corresponding hypotheses in separate sub-sections.

A.1 Domestic Indian group affiliation and firm performance

Indian domestic business groups are predominantly controlled by families. Hence, for purposes of this discussion, family and domestic groups are synonymous. Domestic business group affiliation can be considered to be a *positive* signal by investors if the company is perceived to be backed by established promoters with a track record of performance. This argument is in line with the certification hypothesis, on the assumption that investors face less uncertainty regarding a firm's value, due to its affiliation with a group, thus leading to *less* underpricing of the IPO. Using a sample of large diversified India business groups, Khanna and Palepu (2000) conclude that, on *ex-post* basis, group affiliation is a positive signal. On the other hand, however, the recent literature on family-owned business groups, particularly in the Asian context, reveals that many of the controlling owners of family-owned business groups may "tunnel" the cash flows from companies in which they have low cash flow rights to companies in which they have high cash flow rights, relative to their control rights (see Faccio, Lang and Young (2001) and Faccio and Lang (2002), for example). This evidence suggests that group affiliation may act as a *negative* signal regarding a firm's value. Bertrand, Mehta and Mullainathan (2002) find support for tunneling, i.e. diversion of resources from firms where the controlling family has low cash flow rights to those where it has high cash flow rights, in the Indian business groups. On an *ex-ante* basis this complexity associated with cross-holdings between group companies increases outside investors' uncertainty, leading to *greater* underpricing as shown in Japan by Dewenter et.al. (2001). Therefore, there are two competing hypotheses regarding the effect of group certification on firms' initial stock market performance: the "certification" hypothesis, which predicts lower underpricing for group-affiliated companies, and the "tunneling" hypothesis, which predicts the opposite.

We also aim to bring greater clarity to the understanding of the evolution of pyramidal groups, in which companies are connected by a hierarchical structure of ownership relationships,

by studying the effect of domestic group affiliation on firm performance. The existing studies on pyramidal structures focus on the effect of group affiliation on firm performance (based on accounting and market variables) as measured on an *ex post* basis. In contrast, we attempt to address part of the pyramidal organizations' evolutionary process, by examining whether the market recognizes group affiliation as a positive or a negative signal, right at the point where public investors are considering acquiring ownership. Hence, our study is likely to have relatively less severe problems of endogenity, which plagues most of the ownership structure and firm performance literature.

A.2 Foreign group affiliation and firm performance

Foreign groups are typically large multinational corporations that are thought of as more efficient and transparent in their corporate governance practices. Since the company going public is typically a subsidiary of the multinational company, there is an inherent conflict of interest between the parent and these subsidiaries, with regard to various transfer payments for the use of brands, technology and corporate services. At the same time, the parent company would like to time the IPO where it derives maximum benefit for the parent. However, subsidiaries can realize value through better technology transfer especially in developing economies like India, which can be perceived as a positive signal. Hence, an IPO from an MNC subsidiary can be perceived as a negative signal due to the transfer pricing and over valuation hypotheses, and as a positive signal due to the technological advantages such a company enjoys in a developing economy. Hence, overall, the null hypothesis is that MNCs should not have any group affiliation effect and, therefore, foreign group affiliation should not influence the degree of underpricing.

A 3 Government affiliation and firm performance

Companies controlled by the governments, both state and central (national), are often regarded as being subject to political and bureaucratic interference, and therefore, not looked upon favorably by investors. On the other hand, these companies are subject to closer public scrutiny through oversight bodies empowered by the state legislatures and the national parliament. Bias and Perotti (2002) argue that governments may intentionally underprice during

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privatization programs to gain political popularity from the voting public. This may not hold in India as the investing public is a fairly small segment of the Indian population. The literature is divided on the effect of government affiliation on IPO performance. Menyah and Paudyal (1996), Jelic and Briston (1999) and (2003), Choi and Nam (1998)) report higher underpricing for government IPOs. However, on closer examination, Dewenter and Malatesta (1997) find that underpricing is more evident in government privatization in unregulated industries. In our case, many of the privatized companies in India continued to be controlled/regulated by the government, since the government still retained a controlling interest in most of them. Meggison, Nash, Netter and Schwartz (1999), using 30 countries data, show that government IPOs yield positive long run abnormal returns. Although they do not attribute the positive abnormal returns to any specific hypothesis, these results are in contrast to the generally negative long run returns of IPOs of (non- government) firms in several other countries. In our context, one may hypothesize that association with the government may be a negative signal, due the possibility of political and bureaucratic interference, and a positive one, from the point of view of closer public scrutiny.

A 4 Investor Overreaction for IPOs

Apart from the above three types of firms and their corresponding hypotheses, a major institutional aspect of Indian capital markets is the importance of IPOs, relative to secondary market activity, and the level of investor interest they generate. Most IPOs in India tend to get over-subscribed. As shown in Panel B of Table 1, the average oversubscription rate ranges from 6 to 14 times for different groups. One reason for such excess demand is the allotment process, in the event of over-subscription. Unlike in the US and other countries, where IPO allotment is taken care of by the underwriter, Indian IPOs are allocated to investors based on a rationing process, on a progressive, pro-rata basis. Hence, the majority of the unfulfilled demand in the primary market is met in the secondary market, once the stock is listed. We argue that the excessive bidding to meet the unfulfilled demand, after the stock is listed, can cause the IPO to appear underpriced, ex post. We term this phenomenon as the "overreaction hypothesis". It should be noted that overreaction should be driven by firm reputation. Hence, better certified companies should experience higher overreaction after listing.

In summary, irrespective of the type of group affiliation, in a broader context, group affiliation can be treated as a positive signal according to the certification hypothesis, while the explanation for the alternative hypothesis varies based on the nature of affiliation. In the case of domestic groups it is due to tunneling, in the case of foreign groups, it is due to transfer pricing, while in the case of government companies, it is due to potential political and bureaucratic interference.

The question we wish to examine is whether the market views the IPOs of companies in the three groups somewhat differently. We are also able to investigate the effects of structural changes in the market, and in the regulatory framework, since the period of our study spans three different regulatory regimes in India. During this period, as detailed in the next section, the Indian economy emerged from a highly regulated, state-controlled structure to a relatively liberalized, open one.

B. The Indian primary market

The primary market for equity in India gained momentum after the liberalization initiative taken by the government in the early 1990s. Following the improvement in the growth rate of the economy at that time, there were a large number of IPOs, particularly during the period 1990-2004.[8] Unlike the US market, which is the basis for many IPO studies, the Indian IPO market has been dominated by retail investors (see Aggarwal (2000)). During the last fifteen years, the Indian IPO market has undergone many changes that are widely seen to have improved its transparency and efficiency. In particular, the initial years of liberalization, after 1990-91, witnessed a boom in the Indian IPO market. With fewer regulations during this period, many entrepreneurs used the primary market as the main vehicle to raise capital as well as reduce their own holdings. A majority of the IPOs in our sample were issued during the first five years of liberalization (1990-95). The spurt in interest in the equity markets also witnessed several instances of "fly-by-night" entrepreneurs who eroded investor wealth.[9] During 1995-96, the new

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[8] Source: Securities Exchange Board of India (SEBI) Public Issue Guidelines.

[9] The weakness of then-prevailing regulations attracted the SEBI's attention after a major primary market scandal related to an infamous IPO by MS Shoes Ltd in 1995. In the same year, SEBI took some initiatives by appointing

securities regulator, the Securities and Exchange Board of India (SEBI), introduced more regulations on IPO pricing and enforced other restrictions on promoters, such as the lock-in period for their holdings.[10] This resulted in a slump in the IPO market immediately following this period.

To encourage equity participation after the 1995-98 slump, between 1999 and 2000 the SEBI tried to shore up investor confidence by tightening its norms for public issues of equity. Some of the main changes are related to: (1) financial reporting norms; (2) allotment norms; (3) cost/efficiency norms; (4) transparent book building procedures.[11]

Thus, there have been three distinct regimes in the Indian primary market, namely, (1) the immediate post-liberalization regime (1990-1995), (2) the initial regulated regime (1996-2000), and (3) the reformed regulated regime (2001- 2004).

C. The IPO Allotment Process

The allotment process for IPOs in India is quite different from other markets such as those in the United States. In the event of oversubscription, the allotment mechanism in the Indian market is *not* discretionary. It is based on a formula decided by the company on the advice of the investor banker, but is strictly based on the guidelines issued by the regulator and supervised by the stock exchanges. There have been some changes to the allocation formula over the sample period.[12] However, the formula has always had the common feature that, in the event of over-subscription, the allotment is made through a rationing mechanism. The rationing system creates an artificial barrier for an investor to have his/her demand filled in full. Since 2000, when the book-building mechanism was introduced in the Indian market, investment bankers managing some, but not all, IPOs have used it. However, the use of book-building still does not rule out the possibility of excess demand and consequent oversubscription. This is particularly

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the Malegam Committee to recommend appropriate regulations for closer scrutiny of proposed offerings. See Shah and Thomas (2001) and Rao (2002) for more details.

[10] In the parlance of the Indian market and regulations, a "promoter" is the controlling shareholder in the company, and thus, is responsible for its management.

[11] Details of these changes are provided in the more detailed version of this paper available upon request from the authors.

[12] Since the late-1970's, the allotment ratios have been different for various investor categories, such as institutional investors, non-resident Indians, and retail investors, typically with a progressive structure built in: small investors receive a greater proportional allocation than larger investors. This has been since been altered to a straight proportional allocation in each category, in the aftermath of the allotment scam in 2004.

true if a large number of potential investors do not participate in this process and the book-building process does not lead to full price-discovery. Furthermore, orders placed in the book-building process are not binding, and could encourage larger players to game the system by not registering their true demand in the book-building process. This is evident in the Indian market, as the oversubscription was not alleviated consequent to the introduction of the book building process. On the contrary, a large allotment scam was reported in 2004. Some investors were prosecuted for creating multiple false accounts to increase their allocations in "hot" issues.[13] This provides some indirect evidence of the over-reaction hypothesis in the Indian market and also shows that rationing process may not necessarily influence excess demand.

III Data and Descriptive Statistics

< INSERT TABLE 1 HERE>

The data set we assembled consists of attributes of IPOs recorded in the CMIE database on Indian capital markets between the years 1990 and 2004.[14] The CMIE classifies a company as affiliated with a group based on an analysis of company announcements and a qualitative assessment of the behavior of the firm in relation to the rest of the group.[15] Table 1 presents the summary statistics of our sample. Panel A presents the year-wise descriptive statistics and Panel B reports the summary statistics during our sample period, 1990-2004. We also divide our sample period into three regimes and present a regime-wise classification of our data in the table. This characterization of the different regimes in the IPO market is designed to control for the effect of structural changes in the Indian market on the results from our study. Regime 1 witnessed the highest number of IPOs, while regime 3 had the lowest. Thus, Regime 1 and

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[13] For example, see the article by Sucheta Dalal published in the newspaper, *Indian Express,* on the 26th April 2004, under the title "Share allotment drama: little to smile about," for a brief description of the allotment scam.
[14] As per the Securities Exchanges Board of India (SEBI) and Prime Database services records, the actual number of public issues raised (including IPOs)in India during 1990 to 2004 was 5667. There is no clear information on the exact number of IPOs among the total public issues. Our sample represents around 52 percent of all public issues issued in India during 1990-2004 and includes substantially all the IPOs issued during this period. We also used the PRIME database that contains Indian primary market data for: 1. matching the information available with CMIE; 2. underwriter information; and 3. over-subscription details for the IPOs.
[15] See the Prowess Users' Manual, Version 2, p.4, for details. Previous studies of group ownership in India such as those of Khanna and Palepu (2000); Bertrand, Mehta and Mullainathan (2002); and Gopalan, Nanda and Seru (2005) use the same classification.

Regime 3 have been "hot" and "cold" issue periods, respectively, for the Indian market, to use the terminology of Ritter (1984). However, unlike in the US market, where the hot issue period was driven by a boom in specific industrial sectors (e.g. the resources sector), in the Indian market, it was due to structural changes in the political economy, primarily through liberalization.

There are 2,713 IPOs in the fifteen-year period of our study in our data set. During this period, a majority of the IPOs (2,147, or 79 percent) were issued by stand-alone firms.[16] The 484 IPOs of private Indian group-affiliated firms represent 18 percent of the total sample. The remaining 82, or 3 percent of the IPOs, are shared between firms affiliated with the government (33, or a little more than 1 per cent) and those affiliated with foreign companies (49, or a little less than 2 per cent). The number of IPOs of stand-alone firms is substantially higher than for IPOs of firms in the other categories. This evidence suggests that most IPOs in our sample have come from new entrepreneurs, after the liberalization of the Indian economy in 1991.

As shown in Table 1, there has been considerable variation in the number of IPOs in each year during our sample period. Most of the IPOs in each category were issued in the first half of the 1990s (Regime 1). This was a boom period for IPOs, largely as a consequence of the opening up of the Indian economy. However, in terms of issue size, the second half of the 1990s (Regime 2) had much larger issues than the first half (Regime 1). The issue size per IPO during Regimes 2 and 3 (post-1996), is substantially higher that of the pre-1996 period (Regime 1). While part of the increase can be attributed to inflation, this broad trend indicates that the IPO market in India became more mature after the SEBI's regulations were introduced, in some cases, and tightened, in others, during 1995-96. As a result, most of the issues made in the post-1996 period were by larger companies, which could pass the close scrutiny of the regulator. However, the number of issues during Regime 3 reduced to a trickle compared to prior years, except for government companies, mainly due to the slump in the world capital markets, following the dot-com collapse

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[16] Our sample size remains 2,713 in Tables 1, 2 and 3. The sample size changes thereafter based on the availability of data for the independent variables in our analysis. Due to these data gaps, the sample size decreases to between 1,911 to 1,905 in Table 4. and between 1,884 to 1,837 in Table 5. However, we did not find any systematic bias in our reduced sample size. We check this by conducting a simple mean difference test to examine whether the means of independent variables in the reduced sample are significantly different from those of the full sample. We also use propensity matching method as described in Table 5. The reduction in sample size in Table 6 is mainly due to the loss of data points for the calculation of the 36 months window of abnormal returns: the observations in the later years, especially after 2002, do not have 36 months abnormal returns, since our sample ends in 2004.

in 2000. In the case of government companies, the continued volume of IPOs was due to the privatization program of the government. The average issue size increased in all firm categories over time, indicating the growing maturity of the Indian primary market.

On average, underpricing is evident across almost all the years in our sample period and across the different categories. Typically, the extent of underpricing is low for firms affiliated with the government. Government-affiliated companies experienced *overpricing*, on the average, for several years in the total study period.

We believe that the lower underpricing in Indian government IPOs may be attributed to two other plausible reasons. First, the size of government IPOs was typically substantially higher than that of other IPOs, as seen in Table 1. In general, as documented in prior studies (see Loughran, Ritter and Rydqvist (1994), which is being regularly updated on Jay Ritter's website); higher issue size is generally correlated with lower underpricing due to the impact of asymmetric information as well as liquidity. Our discussion relating to Panel B in Table 1 which follows this discussion sheds more light on this issue. Second, the bulk of the privatization program, particularly in Regime 1 consisted of selling a substantial proportion of the issue to government-controlled institutional investors, such as the Life Insurance Corporation of India and the Unit Trust of India, on the basis that a larger number of people, who are claimholders in these entities, would benefit indirectly.

In the case of firms affiliated with Indian group companies, underpricing on the average was as high as 394 per cent in 1999 and came down substantially in 2001 and 2002, and was as low as 17.4 per cent in 2002. In 2001, there was only one IPO and it was overpriced. On the average, stand-alone companies experienced underpricing across all years in the study period. The extent of underpricing, on the average, was the highest in 1999 (689 per cent) and the lowest in 2003 (37.5 per cent). Firms affiliated with private foreign groups experienced record underpricing with the highest recorded in 1991 (1,392 per cent) and the lowest in 1995 (24 per cent). There was a wider variation in other years, but those were typically due to an individual outlier in either direction. Table 1 also reports the average 30-day standard deviation of daily returns in the post-listing period. As shown in the table, the size of the standard deviation is not large enough to explain the extent of underpricing. For instance, the average underpricing for private Indian groups is around 140 per cent; however, the average 30-day standard deviation of return after the listing is only 5.7 per cent. This shows that investor uncertainty cannot fully

explain the extent of underpricing. Thus, underpricing is likely to be due more to investor overreaction than to any post-listing risk to investors.[17]

< INSERT FIGURE 1 HERE>

Figure 1 depicts the information on the number of issues in Table 1 as a time-series plot, with the three regimes demarcated along the X-axis. It is clear from the figure that there has been a significant reduction in the number of IPOs after Regime 1. After the boom period in 1995, the number of IPOs has declined over the subsequent decade, with a minor blip in 2000. This pattern is evident across the various types of groups we analyze: private domestic and foreign group-affiliated companies, government companies and stand-alone companies.

< INSERT FIGURE 2 HERE>

Figure 2 shows the extent of IPO underpricing, as measured by the initial returns for firms in the four categories, over the years. It is interesting to see that the extent of underpricing was much higher across all categories in Regime 1, compared to the other two regimes, with the exception of a spike in Regime 2. However, the spike is due to one IPO in the private foreign group. Overall, as mentioned earlier, it is clear that the extent of underpricing has been declining over our sample period.

Panel B summarizes the pooled cross-sectional statistics relating to IPOs during the whole period 1990-2004. This table summarizes the average values of the key variables based on the nature of firm affiliation. Along with average initial return and standard deviation, this table contains the average values for other control variables used in this study. This table also shows

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[17] Chowdhry and Sherman (1996) argue that in many Asian markets the offer price is set prior to the public issue. A low issue price would lead to over-subscription, while a high issue price may result in a failure of the issue. To avoid failure, a risk-averse issuer may underprice the issue. Loughran and Ritter (2002) provide two alternative hypotheses, related to underwriters, for severe underpricing. First, when issuers place more importance on hiring reputed underwriters, they become less concerned about avoiding underwriters with a reputation of severe underpricing. Second, issuers may leave more money on the table when they have personal benefits from the underwriters. They argue that there is substantial evidence in the US that underwriters open personal brokerage accounts to allocate "hot" IPOs to executives and related parties of the issuing company. Since underpricing in India is severe in all regimes (including the "cold" issues period), it may not be due to the second hypothesis. Furthermore, unlike in other markets, underwriters in the Indian market do not have any discretion in the allotment of "hot" issues to favored clients.

that the highest underpricing, on average, across the fifteen year period of our study is for firms affiliated with private foreign groups. Private Indian group-affiliated companies, stand-alone companies and government-affiliated companies follow in hierarchical order. It is interesting to note that the 30-day standard deviation of returns, after listing, also follows the same hierarchical order. It is clear from the table that there has been excess demand for IPOs in all categories. However, the excess demand, reflected in the extent of oversubscription, is higher among both Indian and foreign group-affiliated firms, compared to stand-alone and government-affiliated firms. On average, Indian and foreign group-affiliated firms got oversubscribed 14 times, which is significantly greater than for stand-alone firms and government-affiliated firms, which were oversubscribed 9 and 8 times, respectively.

The average asset size of the firms in our study varies based on the nature of affiliation. Firms with government affiliation are relatively large in size at the time of the IPO. The IPOs from government-affiliated companies are mostly the result of the government's disinvestment plan. Throughout our sample period, the central and state governments in India divested their stakes in some of the large public sector companies through IPOs. Consistent with the yearly data in Table 1, the underpricing of government-affiliated companies is quite low. These firms also exhibit the lowest standard deviation of returns in the post-listing period. It is surprising to see that the asset sizes of group-affiliated firms (both domestic and foreign) are smaller than those of stand-alone firms. It is generally expected that a venture from an established group should be of greater size than a similar venture from a stand-alone firm. The descriptive statistics also indicate that the IPOs of smaller firms are underpriced more often and to a greater degree. Thus, asset size is an important control variable in our study.

Another important variable summarized in the table is the share premium. The share premium represents the difference between the par value of the share and the issue price.[18] The prospectuses of all IPOs clearly state the share premium for a given IPO, with the practice continuing even today. Although it is the issue price that matters from an economic perspective, there is casual evidence that the share premium, which is widely quoted in the prospectus and other related public announcements by the company, acts on investor psychology. Table 2 shows that the average premium charged by all affiliated firms is higher than that charged by stand-

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[18] Par value is an accounting concept indicating a standard value per share. Most Indian IPOs are issued with a Rs. 10 par value, with the "premium" being the excess of the issue price over par.

alone firms.[19] Given that the oversubscription is high for group-affiliated firms, higher premium may indicate that group-affiliated firms are perceived as more reputable firms by the investors.

The subscription details for IPOs by type of investor — promoters (insiders), the public, institutions, and others — are also summarized in Panel B. The promoters' participation figures clearly show that most of the government-affiliated companies are part of government disinvestment plans. The average promoters' subscription for government-affiliated firms is only 3.7 per cent. The other affiliated firms (private Indian groups and private foreign groups) have a higher level of promoter participation than that of stand-alone firms. The level of public participation in all IPOs is quite similar. However, the level of institutional participation varies based on the nature of group affiliation. Government-affiliated companies, on the average, have the highest level of participation by institutional investors. (Several of the large domestic institutional investors are controlled or tightly regulated by the government.) Stand-alone companies come next. It is again surprising to see that institutional participation is quite low in both categories of group-affiliated companies. It is generally presumed that higher (or lower) level of institutional investor participation signals a higher (or lower) quality of the firm making the IPO. Insitutional investors are presumed to be better informed about IPO quality; hence, they indirectly provide certification regarding firm value. It follows that higher institutional investor participation should indicate lower underpricing. However, it can also be argued that higher institutional participation is not desirable in the case of group-affiliated companies, from the perspective of the controlling group, since a higher level of participation of institutional investors reduces the group's control over the firm and subjects it to institutional scrutiny.[20]

< INSERT TABLE 2 HERE>

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[19] In our sample there is no significant cross-sectional variation in the offer price. Many studies on the US market exclude from consideration IPOs with very low offer prices. Until a few years ago, during Regime 1 and part of Regime 2, most IPOs in India were at a standard price of Rs 10 (or Rs 100, in a few cases) per share, which was "par." Of course, this price had no economic significance, because significant dilution had occurred, with the result that the number of shares at this price was appropriately adjusted. Indeed, several of the quality issues were made at par in earlier years. Thus, in contrast with the US studies, we segment the IPOs by their asset size rather than by their offer price. It should be noted that we did not include the share premium in our regression analysis as it is part of the issue price. In addition, the issue price is also an ingredient in the calculation of the initial return of the IPO, which is our dependent variable.

[20] In many cases, institutional investors obtain a seat on the boards of companies where they have a stake.

Following the preliminary insights from Table1, we extend our analysis to the investigation of the statistical significance of the differences between the key variables across the different categories of firms. Table 2 presents the results of the tests of the mean differences between the key variables. We use analysis of variance (ANOVA) tests to evaluate whether there is any evidence that the means of the various sub-populations differ. However, if there are more than two sub-groups (we have four categories in our analysis), it is inappropriate to compare each pair using a simple *t*-test because of the problem of multiple testing. For this reason, we used the Tukey multiple comparison test, which compares differences between the means, with appropriate adjustments for multiple testing (see Tukey (1977) and Bland and Altman (1995)).

Table 2 tests the differences in the means of each group with those of other groups. For instance, the cell at the intersection of the first row and the third column shows the difference between the means of private Indian group affiliated companies and stand-alone companies for the initial return variables. The *p*-values are shown in the parentheses below each mean difference value. The initial returns or the extent of underpricing between group-affiliated companies, both private Indian and foreign, and stand-alone companies is significantly different. The positive mean difference value indicates that the domestic group companies' mean value for initial returns is higher than for stand-alone companies. Likewise, the mean difference values can be interpreted for other variables, and used in comparisons between other pairs of groups. In summary, the results of tests of differences in the means provide strong evidence that group-affiliated firms (both domestic and foreign) are quite different from stand-alone companies and government-affiliated companies in terms of their asset size, share premium, issue size, promoter participation, institutional investor participation and the extent of over subscription.

IV Results

A. Regression results

< INSERT TABLE 3 HERE>

Table 3 presents regression results for the initial returns from IPOs to help examine the causal relationship between the extent of underpricing and firm characteristics. We consider six sets of independent variables. The first set consists of firm characteristics such as issue size and asset size.[21] The second set consists of the group affiliation dummies for three of the four categories we have defined. The third set of characteristics relates to the industry dummies for the IPOs. We use 4-digit industry codes of CMIE, which are similar to SIC codes in the United States, to control for industry effects. The fourth set of variables consists of dummies for the three regimes (with Regime 3 being excluded) defined earlier that sub-divide our time series. The fifth set is composed of investor dummies for promoter, public and institutional participation. (The "others" category of investor participation is excluded). The dummy variable takes the value 1 for the corresponding category, and 0, otherwise. For instance, for the dummy variable defining government companies, the value is 1 for the corresponding data related to government companies and 0 for the remaining categories.

We estimate five regressions for different sets of independent variables, in order to assess the incremental impact of each set of variables on the extent of underpricing. Even though asset size varies significantly across the different categories we have defined, we find no evidence of any significant relationship between asset size and the extent of underpricing. However, the coefficient of the issue size of the IPO is negative and significant. This implies that the larger the issue size, the lower is the underpricing, which is in line with the results of other studies (See, for example, Loughran, Ritter and Rydqvist (1994) and the references cited therein). The domestic group dummy is positive and highly significant in all five regressions. Thus, after controlling for other factors, we find that being part of a private Indian group influences the extent of underpricing in a positive manner. The same positive relationship for the extent of underpricing holds for firms affiliated with private foreign groups[22].

Our results relating to the variations across regimes are reported in Regressions 3, 4 and 5 in Table 3. The coefficients of the dummy variables for the regimes indicate that structural changes in the IPO regimes did not influence the extent of underpricing. Hence, underpricing has

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[21] The correlation between issue size and asset size is quite low (0.021). Hence, there is no serious issue of potential multicollinearity here. Also, it should be noted that we dropped the age of the firm as an independent variable, since it is highly correlated with asset size.

[22] Given that the underpricing of foreign groups firms is very high, and their number is quite low, there is every chance that underpricing might be driven by foreign group firms. We therefore excluded foreign firms from the sample as a robustness check and find that the qualitative nature of the results does not change even after this exclusion.

been more or less evenly spread across our sample period. The promoter participation and institutional participation variables are negative and significant. This indicates that investors perceive higher participation of promoters and institutional investors as positive signals: institutional investor participation and public participation *reduces* the extent of underpricing. This indicates that institutional interest signals firm quality and improves the valuation.

Although not reported in the paper, we also examined whether group-specific variables explain the extent of underpricing for group companies. We used group size and the number of companies in a group as controls for size and the extent of group diversification respectively. We find that both variables are not statistically significant in explaining the extent of underpricing. Hence, we conclude that group effect may not drive the results reported in Table 3. As a robustness check, we also ran regressions using interaction variables with regime dummies and firm-specific variables (issue amount and asset size) to see whether the regimes and the corresponding firm characteristics influence the extent of underpricing. We find that the interaction variables to be insignificant and hence the results are not included in the paper.

A.1 Testing the over-reaction hypothesis

The evidence so far shows that, the traditional theories of information asymmetry, similar to the Dewenter et.al (2001) tradeoff hypothesis between visibility and opaqueness as a mechanism for underpricing of group-affiliated firms, for the Japanese market, may not fully explain the extent of underpricing in the Indian market. This is mainly due to the higher underpricing of foreign group-affiliated firms. We now turn our attention to behavioral explanations for understanding the higher underpricing of group affiliated firms. A recent paper by Purnanandam and Swaminathan (2004) argues that, in the US market, behavioral explanations fit better than traditional, rational models to explain initial underpricing and subsequent underperformance of IPOs. In particular, they provide evidence in support of the predictions of DHS that stock prices initially overreact to information due to investor overconfidence that gathers further momentum due to the self-attribution bias of investors. The momentum finally results in reversal after information is fully revealed. Although Purnanandam and Swaminathan (2004) point out that overconfidence enters into picture due to the excess demand of investors

who are most interested in IPOs, they could not test their conjecture for lack of data regarding the excess demand of investors.

We are fortunate to be able to obtain data on this excess demand – the extent of over-subscription of each IPO. With this data, we are able to measure the excess demand of investors, and thus provide a proxy for overconfidence and subsequent overreaction. The over-reaction hypothesis asserts that the excess demand results from the attention that group-affiliated firms attract in relation to stand-alone firms (perhaps due to their respective reputations, for example), and creates uncertainty about the allocation that investors will obtain from the IPO. This holds especially when the allocation process is rationed accordingly to a well-publicized formula, as in the case of Indian market. The higher the extent of over-subscription, the more severe will be the shortage in the investors' allocation. In order to reach their desired allocation, investors will be forced to buy the stock after listing in the stock market, thus driving up the price. This results in greater underpricing of the IPO, as measured by its initial return. Thus, underpricing and oversubscription should be positively related, according to the over-reaction hypothesis.

Regression 5 uses the extent of over-subscription, after controlling for all other variables in Regression 4, as a variable to explain underpricing in IPOs. Consistent with the overreaction hypothesis, we show that the extent of subscription has a positive and highly significant coefficient, for both domestic and foreign group-affiliated firms. This confirms that the overreaction hypothesis provides a better explanation than the tradeoff hypothesis proposed by Dewenter et al. (2001): due to higher over-reaction (estimated by higher subscription) for group affiliated firms, there is higher underpricing compared to the stand-alone firms.

B. Post-IPO performance

B.1 Firm survival analysis

< INSERT TABLE 4 HERE>

We further investigate the post-IPO performance of firms in the various categories to gain some insight into the long term survival and stock market performance of the firms that issued an IPO. The results are presented in Table 4.

We estimate the success probability of a given firm based on its category of affiliation by using binary probit model. We use the current listing band of a given IPO in the Bombay Stock Exchange in India (BSE) as a proxy for the long-run success of the IPO. The BSE classifies all listed stocks into different quality bands, namely, A, B1, B2, C and Z groups.[21] Shares that are classified in the A band are generally the large, liquid, blue chips of the Indian stock market. B1, B2 and C follow in the quality hierarchy from high to low. The firms that are classified as Z are usually failures. These companies are classified as such either because they declared bankruptcy or because they violated the listing norms of the BSE, and were, therefore, suspended from trading. Thus, the BSE classification acts as a barometer for a firm's success in the Indian stock market, somewhat akin to a rating from a credit rating agency. Given that none of the IPOs is classified as a Z group company at the time of the IPO, we estimate the survival probabilities using binary probit model that classifies Z group companies are 0 and the remaining A, B1, B2 and C companies as 1[23].

The results are presented in Table 4. We used both private Indian and private foreign group dummies that take the value 1 if the firm is affiliated with a private domestic or foreign group, respectively, and 0 otherwise. The coefficient of the size of the company, measured by dollar value of assets, is positive and significant. This indicates that large firms survive better than small firms. This result is consistent with the IPO literature (See Jain and Kini (1999) and Howton (2006)). After controlling for industry effect, we find that Indian group affiliation does not translate into firm survival as predicted by the certification hypothesis. However, the results indicate that foreign group affiliation leads to better survival. The extant of underpricing is not statistically significant. Overall, since the purpose of certification which mainly comes through firm survival is defeated in the case of domestic business groups, the results support the tunneling hypothesis compared to certification hypothesis for domestic business groups.

B.3. Long-run performance of IPOs

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[23] IPOs do not start out as a Z group firm and at the same time they may not start as an A group firm. Given that we do not have data on the initial listing group of a given IPO we use simple binary probit model. We thank the referee for the suggestion to use binary model rather using an ordered probit model that grades companies based on their current group classification. .

< INSERT TABLES 5 and 6 HERE>

We next analyze the long-run return performance of IPOs for firms in the various categories discussed earlier. The results are reported in Tables 5 and 6. Consistent with the IPO literature relating to the evidence in other countries (see, for example, Ritter, 1991), we find that the average long-run return performance of firms, post IPO, is significantly negative. This has been consistently true for different horizons — 12, 24 and 36-month windows — indicating the systematic over-optimism of the investors regarding the performance of new investment opportunities.[24] This consistent with the behavioral theory of initial overreaction and subsequent reversals proposed by many authors including, Barberis, Shleifer and Vishny (1998), Daniel et. al (1998), and Hong and Stein (1999)[25].

In Table 5, we report the long-run return performance statistics for our data set. We use both the Buy-and-Hold Abnormal Return (BHAR) and the Cumulative Average Abnormal Return (CAAR) measures for our long-run performance analysis. These are the standard metrics used in the IPO literature and represent different ways of defining the return: BHAR is the risk-adjusted return based on buying at the beginning of the period and selling at the end, taking into account any intervening distributions, while CAAR is the cumulative average return assuming, compounding in each period (see, for example, Brav, Geczy, and Gompers (2000)). Among the different firm categories we had defined earlier, we find that the magnitude of negative long-run stock market performance is *greater* for private foreign groups and private Indian groups than for

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[24] See Ritter (1991), Levis (1993) and Aggarwal, Leal and Hernandez (1993), for US, UK and Latin American markets respectively. Also, it should be noted that our sample size for the long term analysis is smaller compared to the short-term and IPO analyses, because our sample period does not completely cover the different horizon periods in all cases. The sample sizes are reported in the tables.

[25] The excess demand may be spurious and may not represent the real excess demand as the issues are rationed. However we believe that the excess demand can be attributed to investor behavior for two reasons: 1. The "insufficient allocation" problem should normally be rectified through the book-building process, since there should be better matching of supply and demand in this case. Hence, the oversubscription should be lower for issues with book-building. However, we find that this is not true in our sample: the oversubscription is very high even for book building IPOs. 2. There is a positive relationship between issue size and the extent of over subscription in our sample. In Table 2, the ANOVA results indicate that the over subscription of business group IPOs is significantly higher than stand-alone and government companies. One would expect large issues to have less of a problem of excess demand. However the oversubscription rates indicate the opposite. (Anecdotally, there are several instances in the Indian market where several issues, some of them of substantial size, got over-subscribed within minutes of opening for public subscription.) Hence, the investor reaction here can be portrayed as at least partly "behavioral," in the absence of an alternative explanation.

stand-alone companies. However as indicated in Table 6, which reports whether there is any significant variation in long-run performance across the various categories in our sample, shows that there is no significant difference in long-run performance between the four groups. There appear to be no clear differences among the post-IPO return measures that are statistically significant. This confirms the conjecture that long-run underperformance, similar to other markets, is more a general phenomenon across all types of firms.[26] Thus, the negative performance of firms affiliated with domestic and foreign groups is not that significant on a relative basis.

We also report raw buy and hold returns for the 12, 24 and 36 month windows. The raw returns indicate that the performance of *all* IPOs over all three horizons is good, in absolute terms, with returns ranging between 51 per cent and 98 per cent, per annum, for all groups. However, when adjusted for market returns over the corresponding horizons, the excess returns turn out to be poor.

V. Conclusion

We document the results of a comprehensive study of the Indian IPO market focusing on the effect of group affiliation on the initial performance in the post-listing market. We use a relatively large sample of 2,713 IPOs that were issued in India between 1990 and 2004 to test whether group affiliation affects the extent of underpricing. We test two competing hypotheses on the relationship between group affiliation and the extent of underpricing. In the case of family groups, the "certification" hypothesis asserts that, in less developed capital markets, groups form internal capital markets to help member companies in the case of financial distress. Thus group affiliation acts as a positive signal, resulting in lower underpricing than for stand-alone companies. On the other hand, the "tunneling" hypothesis asserts that, due to excessive control of the family on group companies, the controlling family may expropriate the future cash flows of the affiliated companies. Thus, group affiliation acts as a negative signal, resulting in greater

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[26] There is a long-standing debate on mis-measurement issues related to the methodology used to calculate long-run performance. For instance, Brav, Geczy, and Gompers (2000) show that the choice of performance measurements directly determines both the size and the power of statistical tests. However, we believe that the magnitude as well as the consistency of our results, for different horizons and for both measures of return performance, is striking, notwithstanding this theoretical argument.

underpricing. Variations of these arguments can be made in the case of foreign and government group companies.

We find that underpricing is greater for firms affiliated with groups. We find that our results also hold for both domestic and multi-national private foreign groups that are presumed to be more transparent; hence, we cannot attribute underpricing solely to the tunneling effect or complexity of group affiliation as argued by Dewenter et al. (2001).

We, therefore, extend our analysis to uncover the possible reasons for higher underpricing in both domestic and private foreign groups, by examining the post-IPO success of the firms. Our survival analysis indicates that Indian group-affiliated companies do not survive better than stand-alone companies. The long-run IPO performance results, measuring the stock market performance of the firms, are consistent with the results in other countries: in the long run, firms that were underpriced in their IPOs experience negative performance over time.

Again, overall, our results support tunneling hypothesis rather than the certification hypothesis. Several interesting questions for future research arise from our research. What steps can be taken to reduce investor overreaction to IPOs? Are family business groups optimal organizational structures in economies with relatively undeveloped capital markets? Does the existence of business groups help or hinder entrepreneurial growth in the economy? What steps can be taken to reduce investor overreaction to IPOs?

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Table 1. Year-Wise Summary Statistics for IPOs made in India during 1990-2004

This table summarizes the data on 2,713 Initial Public Offerings (IPOs) issued in India during 1990-2004, on a yearly basis, for the whole period and for sub-periods (regimes). The data are classified into four groups, based on the nature of the ownership of the firm making the IPO; namely, Private Indian Groups, Stand-Alone Companies, Government Companies and Private Foreign Groups. The initial return is calculated as the proportionate change between the issue price and the first listing price on the stock exchange (the Bombay Stock Exchange). The total amount raised is presented in Indian Rupees. A crore is 10 million Rupees and the current foreign exchange rate (November 2005) is about 45 Indian Rupees to one US $. The data are also classified into three regimes based on the major structural changes that occurred in the Indian primary market. Regime 1 (Reg 1) (1990-95) is the IPO boom period, soon after the liberalization of the Indian economy, when the regulatory restrictions were mild. During Regime 2 (Reg 2) (1996-00) restrictions were introduced regarding pricing and other aspects of the issue. Regime 3 (Reg 3) (2001-04) is the period after the introduction of book-building process for price discovery.

PANEL A

Year	1990	1991	1992	1993	1994	1995	Reg 1	1996	1997	1998	1999	2000	Reg 2	2001	2002	2003	2004	Reg 3	Grand Total
Private Indian Groups																			
No. of Issues	7	33	74	100	129	72	415	32	7	-	10	12	61	1	4	1	2	8	484
Total Amount Raised (In Rs. Crores)	147	497.7	1045.7	1334.3	2354.7	4389.1	9768.0	1290.9	1086	-	1111.9	1591.6	5080.4	49.89	1561.5	95	402.1	2108.5	16957
Average Issue Size (In. Rs. Crores)	21	15.08	14.12	13.34	17.03	30.12	17.36	14.51	35.28	-	111.19	135.13	57.72	49.89	506.05	95	201.02	253.19	25.55
Average Issue Premium (Issue price/Face value)	1.41	1.5	1.23	4.67	2.14	2.6	3.05	2.6	1.12	-	11.2	2.63	4.29	1	5.25	5	1.1	2.83	4.63
Average Initial Return (%)	85.5	299.5	219.68	141.84	93.61	34.87	145.83	18.08	38.29	-	393.54	41.33	122.81	-32.5	17.4	140	80.03	51.23	140.07
Median Initial Return	72	180	90	40	50	20	50	2.5	7.5		393.54	-3.22	10	-32.5	12.9	140	52.17	3.5	50
Average 30-day Standard Deviation	3.70	4.49	2.92	7.80	5.51	5.46	5.4	2.89	3.89	-	24.46	6.98	7.52	1.01	7.17	4.19	5.74	5.61	5.74
Stand-Alone Companies																			
No. of Issues	12	40	129	270	535	738	1724	329	16	8	15	42	410	10	-	2	1	13	2147
Total Amount Raised (In Rs. Crores)	130	190.3	788.94	1436.9	3382.5	4432.1	10360	1900.2	189.9	207.3	238.48	814.23	3350.1	304.1	-	32.6	16.95	353.66	14065
Average Issue Size (In. Rs. Crores)	10.8	4.64	6.11	5.32	6.32	6.01	6.01	5.7	11.87	29.62	15.89	19.38	8.20	17.12	-	16.3	16.95	16.97	6.62
Average Issue Premium (Issue Price/ Face Value)	1.33	1.01	1.08	1.36	1.58	1.81	1.60	1.26	1	1.24	1.26	1.58	1.28	2.37	-	1	1	1.55	2.14
Average Initial Return (%)	251	241.9	97.76	67.50	86.53	43.94	131.47	80.36	131.0	62.8	688.62	52.24	203.01	70.69	-	37.5	50	52.73	78.78
Median Initial Return	250	175	40	30	50	20	33.33	10	17.25	5.26	353.75	11.66	12	25	-	37.5	50	37.5	30
Average 30-day Standard Deviation	8.38	5.14	2.59	2.86	3.36	3.01	3.13	1.93	3.17	3.23	13.68	2.99	2.68	2.35	-	4.60	3.06	2.91	3.06

Government Companies																			
No. of Issues	1	-	1	1	9	2	14	2	5	-	1	2	10	1	4	1	3	9	33
Total Amount Raised (In Rs. Crores)	-	-	217.36	525	765.29	2478	3985.6	1030	1287.	-	125	205.1	2647.1	150	937.6	240	715.1	2042.7	8675
Average Issue Size (In. Rs. Crores)	120	-	217.36	525	85.03	1239	306.58	515	257.54	-	125	102.54	264.77	150	234.42	240	238.35	226.97	271.13
Average Issue Premium (Issue price/ Face Value)	1	-	1.5	1	3.05	2	2.5	5	1.5	-	1.5	4.75	2.66	4.27	1	1	5.33	2.98	3.5
Average Initial Return (%)	-71	-	370	21.42	55.04	-20.04	106.60	146.98	10.94	-	23	-4.5	44.105	-5	33.58	49.1	52.18	32.46	53.62
Median Initial Return	-71	-	370	21.42	5	-20.04	0.57	146.98	8.88	-	23	-4.5	8.19	-5	2.5	49.1	52.17	22.85	11.66
Average 30-day Standard Deviation	55.3	-	1.38	4.07	4.38	2.57	7.5	2.78	6.47	-	0.63	0.33	4.92	0.25	1.14	0.38	2.09	1.27	1.27
Private Foreign Groups																			
No. of Issues	2	9	6	7	8	7	39	3	-	1	1	4	9	-	-	-	1	1	49
Total Amount Raised (In Rs. Crores)	7.73	80.4	99.07	119.73	170.61	70.98	548.52	47.38	-	1.75	55.13	291.04	395.3	-	-	-	365	365	1309
Average Issue Size (In. Rs. Crores)	3.86	8.93	16.51	17.10	21.32	21.32	14.06	15.79	-	1.75	55.13	72.76	49.3	-	-	-	365	365	24.99
Average Issue Premium (Issue Price/ Face Value)	5.25	6.83	6.63	4.5	7.42	2.5	5.71	2.41	-	4	4.5	2.37	2.80	-	-	-	7	7	8.76
Average Initial Return (%)	275	1392.	157.5	261.3	92.70	24.28	367.13	44.5	-	1899	152.2	356.54	613.06	-	-	-	26.98	26.98	351.01
Median Initial Return	275	700	115	137.5	75	30	100	50	-	1899	152.22	21.77	26.98	-	-	-	26.98	26.98	75
Average 30 day Standard Deviation	2.22	9.99	2.88	3.09	2.90	3.01	4.56	1.17	-	8.73	94.4	5.49	14.27	-	-	-	5.49	36.78	7.08

PANEL B
Comprehensive descriptive statistics for IPOs issues during 1990 - 2004

Variables of Interest	Private Indian Groups	Stand-Alone Companies	Government Companies	Private Foreign Groups
Average Initial Return (%)	140.07 (349.46)	78.78 (285.44)	53.62 (100.06)	351.01 (855.99)
Average 30 day Standard Deviation (%)	5.74 (11.29)	3.06 (4.77)	1.27 (10.14)	7.08 (14.14)
Average Asset Size at the time of IPO (In Rs. Crores)	102.83 (384.82)	360.44 (251.05)	17194.92 (20963.42)	64.21 (133.94)
Average Issue Size (In Rs. Crores)	25.5 (85.33)	6.62 (11.97)	271.13 (427.08)	24.99 (57.03)
Average Issue Premium (Issue Price/Face Value)	4.63 (11.08)	2.14 (2.70)	3.5 (2.95)	8.76 (24.09)

Average Promoters' Subscription (%)	17.34	12.54	3.76	14.82
	(22.92)	(16.64)	(18.90)	(26.91)
Average Public Subscription (%)	68.63	64.38	69.50	75.28
	(27.01)	(20.97)	(27.22)	(28.90)
Average Institutional and Others Subscription (%)	14.03	23.08	26.74	9.90
	(19.10)	(16.25)	(18.32)	(17.21)
Raw Buy and Hold Return (36 Months) (%)	57	85	88	56
Average oversubscription (times)	14.23	9.06	6.25	14.16
	(20.53)	(55.43)	(7.23)	(21.91)
Percentage of Companies in Z-group of BSE (as of 31.12. 2004)	13	86	0.1	0.9
Number of Observations	484	2147	33	49

Table 2. One-Way ANOVA Multiple Means Comparison Test for IPOs of Private Indian Groups, Stand-Alone Companies, Government Companies, and Private Foreign Groups during 1990-2004

This table is based on data for 2,713 Initial Public Offerings (IPOs) issued in India during 1990-2004. The data are classified into four groups, based on the nature of the ownership of the firm making the IPO; namely, Private Indian Groups, Stand-alone Companies, Government Companies and Private Foreign Groups. The initial return is calculated as the proportionate change between the issue price and the first listing price on the stock exchange (Bombay Stock Exchange). The asset size and issue size are presented in crores of Indian Rupees. A crore is 10 million Rupees and the current foreign exchange rate (November 2005) is about 45 Indian Rupees to one US $. The test statistic presented below relates to the differences between the means in different groups based on the Tukey multiple comparison test. This test allows a comparison of the means simultaneously for multiple samples. For instance, in the case of the initial return variable, the Private Indian Group sample mean is first compared with that of the other three groups. The Stand-Alone Companies sample is also compared in the same manner, but leaving out the Private Indian Group sample, which was compared in the first set. * and ** indicates significance at the 1% and 5% level respectively . The *p*-values are in parentheses.

	Private Indian Groups	Stand-alone Companies	Government Companies	Private Foreign Groups		Private Indian Groups	Stand-alone Companies	Government Companies	Private Foreign Groups
Initial Return					**Premium**				
Private Indian Groups	-	63.26* (0.001)	83.71 (0.427)	-214.26* (0.000)		-	2.68* (0.000)	1.12 (0.797)	-4.12* (0.001)
Stand-Alone Companies		-	20.44 (0.981)	-277.53* (0.000)			-	-1.55 (0.564)	-6.18* (0.000)
Government Companies			-	-297.98* (0.000)				-	-5.25* (0.005)
Private Foreign Groups				-					-
Asset Size					**Promoters' Subscription**				
Private Indian Groups	-	68.38 (0.966)	-1792.07* (0.000)	38.61 (1.000)		-	0.11 (1.00)	16.17* (0.000)	-3.65 (0.654)
Stand-Alone Companies		-	-1716.45* (0.000)	-29.76 (1.000)			-	16.16* (0.000)	-3.64 (0.626)
Government Companies			-	1713.69* (0.000)				-	-19.83* (0.000)
Private Foreign Groups				-					-
Issue Size					**Public Subscription**				
Private Indian Groups	-	20.95* (0.000)	-252.13* (0.000)	0.113 (1.000)		-	3.15 (1.00)	14.72* (0.003)	0.62 (0.998)
Stand-Alone Companies		-	-1.55 (0.564)	-6.81* (0.000)			-	-17.87* (0.000)	-2.53 (0.904)
Government Companies			-	-5.25* (0.005)				-	15.34* (0.029)
Private Foreign				-					-

Groups

Institutional Subscription

Private Indian Groups	-	-3.29* (0.004)	1.73 (0.951)	2.76 (0.776)
Stand-Alone Companies		-	5.02 (0.386)	1.03 (0.995)
Government Companies			-	1.02 (0.955)
Private Foreign Groups				-

Over Subscription

-	5.17** (0.05)	7.98** (0.03)	0.07 (0.492)
-	2.81 (0.405)	-5.10 (0.326)
-	-7.91** (0.05)
-

Table 3. Regression Results with Initial Return as the Dependent Variable

This table is based on data on 2,713 Initial Public Offerings (IPOs) issued in India during 1990-2004. The table presents multiple regression results based on the following equations. (Note: For brevity, only one regression equation is reported. The other equations are nested in Regression 7 below, but with fewer variables on the right hand side).

Regression 7: Ln(Initial return+1) = c + a1 Ln(Asset Size) + a2 Ln(Issue Size) + a3 Private Indian Groups dummy + a4 Stand-Alone Companies dummy + a5 Government Companies dummy + a6 Private Foreign Group dummy + a7 Industry dummies+ a8 Regime1 + a9 Regime2 + a10 Regime3 + a11 Promoters' subscription + a12 Public Investors subscription + a13 Institutional Investors subscription + a14 Other investors contribution + a15 Extent of Subscription + e

The regressions are aimed at testing the relationship between underpricing and variables of interest; namely: asset size, issue size, Private Indian Group dummy, Stand-Alone Companies dummy, Government Companies dummy, Private Foreign Group dummy, CMIE 4-digit industry codes. Promoter's Subscription represents the percentage invested by the promoters for the IPO; Public Investors Subscription represents the percentage subscribed by the public for the IPO; Institutional Investors' Subscription represents the percentage invested by the institutional investors, while Other Investor's Subscription (omitted here as an independent variable) represents the rest of the participation in the IPO. Extent of subscription reports how many times an issue is over or under subscribed. Value 1 indicates no over or under subscription. Underwriter quality is a dummy variable that takes value 1 if the underwriter is one of the top 5 (top 10 in Regression 6) underwriters in terms of the value underwritten. Apart from these variables, the table also reports the coefficients for the regime dummies. Regime 1 is a dummy variable for regime 1 (1990-1995); Regime 2 is a dummy variable for regime 2 (1996-2000); Regime 3 is a dummy variable for regime 3 (2001-2004). The extent of subscription measures the number of time an IPO is over subscribed. Regression 8 presents the results from the second stage of the two-stage least squares regression using firm size as the instrument variable. *, **, *** represent significance at levels of 10%, 5% and 1% levels, respectively. The *t*-values are in parentheses.

Independent Variables	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5
C	3.88	1.09	1.09	5.17	3.49
	(36.66)***	(7.55)***	(1.55)***	(4.88)***	(2.98)***
Asset Size (at the time of IPO)	0.519	0.07	0.089	0.079	0.07
	(1.22)	(1.21)	(1.42)	(1.20)	(1.10)
Issue Size	-0.29	-0.31	-0.42	-0.38	-0.20
	(-4.37)***	(-3.35)***	(-4.32)***	(-3.85)***	(-1.97)**
Private Indian Group dummy	0.76	0.77	0.69	0.63	0.36
	(7.30)***	(4.39)***	(3.87)***	(3.53)***	(1.96)**
Stand-Alone Companies dummy	-	-	-	-	-
Government Companies dummy	0.606	0.34	0.560	0.535	-0.12
	(1.51)	(0.57)	(0.79)	(0.76)	(-0.15)
Private Foreign Group dummy	1.31	2.72	2.73	2.71	1.08
	(4.76)***	(5.83)***	(5.88)***	(5.87)***	(2.13)**
Industry dummies		Yes	Yes	Yes	Yes
Regime 1			-0.36	-0.48	-0.67
			(-0.55)	(-0.73)	(-1.09)
Regime 2			-0.28	-0.43	-0.59
			(-0.43)	(0.66)	(-0.96)
Regime 3			-	-	-
Promoters' contribution				-3.59	-2.47
				(-4.11)***	(-2.36)**
				-	-
Public investors contribution					
				-4.63	-3.30
Institutional investors contribution				(5.27)***	(-3.61)***
Extent of Subscription					0.01
					(5.03)***
N	1914	1913	1913	1905	1905
Adj. R²	0.047	0.0262	0.0932	0.1087	0.2017

Table 4. Probit Model Results

This table is based on data on 2,713 Initial Public Offerings (IPOs) issued in India during 1990-2004. The table reports IPO post-performance results. We use probit model to measure the likelihood of success (or failure) for a given IPO after listing on the stock exchange. The proxy for success (or failure) is the current (as of Dec. 2004) listing category on the Bombay Stock Exchange (BSE). The BSE classifies all listed firms into different quality bands. There are four main quality-based bands on the BSE; namely, A, B1, B2, and Z. The A band represents the best quality stocks in terms of size, liquidity and financial performance and the rest follow in hierarchical sequence, with the Z band representing firms that have violated BSE listing norms or have been declared bankrupt. In the probit model, firms take the values 0 if they are in the Z- group else 1 (for of A, B1, B2). We also use all the control variables that are used in Table 4. The probit model (Model 3) is represented as follows: Prob(Failure) = c + b1 Ln(Size of firm at the time of IPO) + b2 (Private Indian Group dummy) + b3 (Stand-Alone Companies dummy) + b4 (Government Companies dummy) + b5 (Private Foreign Group dummy) + b6 (4-digit industry dummies) + b7 (Regime 1) + b8 (Regime 2) + b9 (Regime 3 dummy) + b10 (Promoters' Contribution) + b11 (Public Investors' Contribution) + b12 (Institutional Investors' Contribution) + b13 (Other Investors' Contribution) + b14 Ln(%of initial return +1) + e. Note that models 1, 2 are variations of model 3, with or without sector dummies, regime dummies and subscription details, respectively. *, **, *** represent significant levels at the 10%, 5% and 1% levels respectively. P-values of Chi-Square statistics are in parentheses.

	Model 1	Model 2	Model3
C	-	-	-
Asset Size (at the time of IPO)	0.07	0.08	0.08
	(0.00)***	(0.00)***	(0.00)***
Private Indian Group dummy	0.13	0.14	0.14
	(0.11)*	(0.13)	(0.14)
Stand-Alone Companies dummy	-	-	-
Government Companies dummy	0.76	0.35	-0.35
	(0.10)*	(0.52)	(-0.52)
Private Foreign Group dummy	0.87	0.82	0.80
	(0.01)***	(0.02)***	(0.03)***
Industry dummies	-	Yes	Yes
Regime 1	-	-0.86	-0.86
		(-0.23)	(-0.23)
Regime 2	-	-0.87	-0.87
		(-0.23)	(-0.23)
Regime 3	-	-	-
Promoters' contribution	-	-0.34	-0.31
		(-0.57)	(-0.61)
Public investors' contribution	-	-	-
Institutional investors' contribution	-	-0.68	-0.64
		(-0.25)	(-0.29)
Extent of underpricing			0.006
			(0.64)
N	1884	1884	1884
Log Likelihood	34.42	222.81	224.67

Table 5. IPO Long-Run Performance Results

This table is based on data on 2,713 Initial Public Offerings (IPOs) issued in India during 1990-2004. The table shows the average cumulative abnormal returns (CAAR) of firms on the BSE 100 index, and the average buy and hold returns (BHAR) of firms on the BSE 100. CAAR and BHAR are calculated and reported for different periods: for 12, 24 and 36 months respectively. The number of observations (N) varies based on the time period used to calculate CAAR and BHAR. CAAR is defined as $1/n CAR_i$; where $CAR_i = \Sigma_{t=1\ to\ T} (R_{it} - R_{mt})$, T = 12 or 24 or 36 months. BHAR is defined as $1/n BHER_i$; where $BHER_i = \Pi_{t=1\ to\ T} (1+R_{it}) - \Pi (1+R_{mt})$, T = 12 or 24 or 36 months, R_{it} = return of firm I and R_{mt} is the market bench mark return (BSE 100 index return). We also report raw buy and hold returns for the 12, 24 and 36 month windows. * indicates values are significant at the 0.01 level. The *t*-values are reported in parentheses.

Ownership Type	Raw Buy and Hold (12 M)	CAAR (12 M)	BHAR (12 M)	N (12 M)	Raw Buy and Hold (24 M)	CAAR (24 M)	BHAR (24 M)	N (24 M)	Raw Buy and Hold (36 M)	CAAR (36 M)	BHAR (36 M)	N (36 M)
Private Indian Groups	0.57	-0.265 (3.61*)	-0.614 (-4.34*)	92	0.51	-0.465 (-4.84*)	-0.792 (-6.40*)	83	0.57	-0.606 (-4.76*)	-0.820 (-5.43*)	79
Stand-Alone Companies	0.88	-0.065 (-1.46)	-0.307 (-1.42)	426	0.80	-0.201 (-3.67*)	-0.792 (-6.40*)	401	0.85	-0.321 (-4.77*)	-0.820 (-5.44*)	391
Private Foreign Groups	0.57	-0.609 (-2.94*)	-0.943 (-7.20*)	12	0.51	-1.015 (-2.91*)	-1.001 (-6.60*)	9	0.56	-0.995 (-2.44*)	-1.012 (-6.18*)	9
Government Companies	0.98	0.082 (0.81)	-0.106 (-0.27)	13	0.84	0.191 (1.80)	0.219 (0.11)	9	0.88	0.094 (0.33)	0.181 (0.04)	6
All Companies		-0.105 (-2.79*)	-0.366 (-2.48*)	543		-0.250 (-5.27*)	-0.448 (-3.23*)	502		-0.373 (-6.39*)	-0.501 (-2.77*)	485

Table 6. One-Way ANOVA Multiple Mean Comparison Test for Testing the Significant Difference Between the Long-Run Performance of Different Groups.

This table is based on data on 2,713 Initial Public Offerings (IPOs) issued in India during 1990-2004, on a yearly basis. The data are classified into four groups, based on the nature of the ownership of the firm making the IPO, namely, Private Indian Groups, Stand-Alone Companies, Government Companies and Private Foreign Groups. The initial return is calculated as the percentage of rate of change between the issue price and the first listing price on the stock exchange (Bombay Stock Exchange). A crore is 10 million and the current foreign exchange rate (October 2005) is about 45 Indian Rupees to one US $. The Test of Differences is based on the Tukey Multiple Comparison Test. This test allows a simultaneous comparison of the means for multiple samples. For instance, in the case of the initial return variable, the Private Indian Group sample mean is compared with those of the other three groups. The Stand-Alone Companies sample is also compared in the same manner, but, leaving out the Private Indian Group sample, which was compared in the first set. * indicates values are significant at the 1% level. The *p*-values are in parentheses.

Variable (i)	Private Indian Groups	Stand-Alone Companies	Government Companies	Private Foreign Groups	Variable (i)	Private Indian Groups	Stand-Alone Companies	Government Companies	**Private Foreign Groups**
AAR (12 MONTHS)					**ARR (24 MONTHS)**				
Private Indian Groups	-	0.0091 (0.972)	0.0283 (0.531)	0.022 (0.719)	Private Indian Groups	-	0.0271 (0.536)	0.0361 (0.279)	0.0114 (0.943)
Stand-Alone Companies		-	-0.192 (0.796)	0.311 (0.446)	Stand-Alone Companies		-	0.009 (0.970)	0.385 (0.227)
Government Companies			-	0.0504 (0.078)	Government Companies			-	0.0475 (0.088)
Private Foreign Groups				-	Private Foreign Groups				-
ARR (36 months)									
Private Indian Groups	-	0.005 (0.993)	0.025 (0.557)	0.0218 (0.666)					
Stand-Alone Companies		-	0.0199 (0.725)	0.0269 (0.495)					
Government Companies			-	0.0468 (0.070)					
Private Foreign Groups				-					

Figure 1. Trends in the Number of Issues of IPOs by Various Categories of Firm Groups in India during 1990-2004

This figure depicts the data on 2,713 Initial Public Offerings (IPOs) issued in India during 1990-2004, on a yearly basis, for the whole period and for sub-periods (regimes). The data are classified into four groups, based on the nature of the ownership of the firm making the IPO; namely, Private Indian Groups, Stand-Alone Companies, Government Companies and Private Foreign Groups. The initial return is calculated as the proportionate change between the issue price and the first listing price on the stock exchange (the Bombay Stock Exchange). We also include BSE 100 (a market bench mark index) annual return as a measure of Indian stock market trends during the same period. The data are also classified into three regimes based on the major structural changes that occurred in the Indian primary market. Regime 1 (Reg 1) (1990-95) is the IPO boom period, soon after the liberalization of the Indian economy, when the regulatory restrictions were mild. During Regime 2 (Reg 2) (1996-00), restrictions were introduced regarding pricing and other aspects of the issue. Regime 3 (Reg 3) (2001-04) is the period after the introduction of a more transparent book-building process for price discovery.
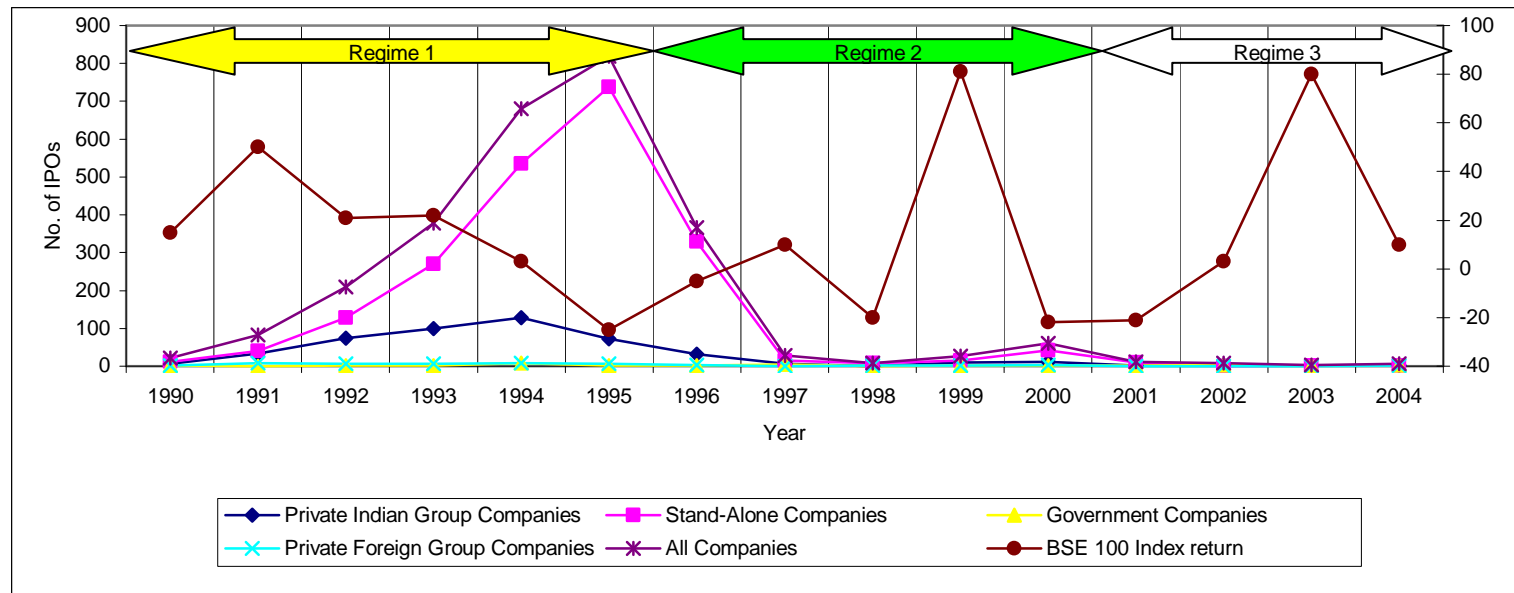
Figure 2. Trends in the Initial Returns of IPO Issues by Various Categories of Firm Groups in India during 1990-2004

This figure depicts the data on the initial returns of 2,713 Initial Public Offerings (IPOs) issued in India during 1990-2004, on a yearly basis, for the whole period and for sub-periods (regimes). The data are classified into four groups, based on the nature of the ownership of the firm making the IPO; namely, Private Indian Groups, Stand-Alone Companies, Government Companies and Private Foreign Groups. The initial return is calculated as the proportionate change between the issue price and the first listing price on the stock exchange (the Bombay Stock Exchange). The data are also classified into three regimes based on the major structural changes that occurred in the Indian primary market. Regime 1 (Reg 1) (1990-95) is the IPO boom period, soon after the liberalization of the Indian economy, when the regulatory restrictions were mild. During Regime 2 (Reg 2) (1996-00), restrictions were introduced regarding pricing and other aspects of the issue. Regime 3 (Reg 3) (2001-04) is the period after the introduction of a more transparent book-building process for price discovery. It should be noted that the peak of Private Foreign Group Companies in 1998 may be slightly misleading, since there is only one observation in the year 1998.