Capital Market Reforms and Allocation of Capital to IPO firms: Evidence from Indian IPOs

Abstract

There is little evidence to show that primary capital markets allocate capital to the most profitable uses. We bridge this gap by examining Indian IPOs. When market regulations are weak, more firms go public and firms with poor fundamentals raise more capital. Over time, primary markets do not necessarily allocate more capital to firms with higher profitability or to those with more growth opportunities. However, the probability of failure declines and the liquidity of IPOs improves. Our results suggest that capital market reforms are not uniformly effective in directing investments to firms with higher investment efficiency.

JEL Classification: G18, G30, G38

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1. Introduction

Emerging markets are more integrated with the rest of the world now and on average, emerging markets received portfolio investments of $22b every *month* during 2010-2014 (Koepake and Farnham, (2015)). In 2014 alone India received $16b in equity investments. By 2019, it had climbed to $18 b. The increasing importance of financial markets around the world suggests that stock markets play a pivotal role in the growth of economy and industry. Several countries such as Korea and India that had a bank-based financial system have moved towards a market-based system although banks continue to be an important source of finance for firms. A fundamental job of the primary capital market is to allocate scarce capital to the most profitable uses. Capital is to be invested in firms that provide the highest returns and withdrawn from those with poor returns. There is very little evidence to show that this is actually so (with the exception of Wurgler (2000), who examines secondary markets). This paper bridges the gap by studying the role of capital (primary) market reforms in directing capital to the most profitable uses. We do this in the context of Indian IPOs using firm level data for 4424 IPO firms over the lifecycle of development of the primary market from 1991 to 2018. Our study assumes importance in the context of growing significance of emerging stock markets.

Our paper is related to Fama and French (2004) who document that the rate at which new firms are listed on the major exchanges in the U.S.A grew from about 160 to 550 percent per year. They find that the characteristics of new lists change in that the cross-section of profitability becomes more left skewed and growth more right skewed. This characteristic results in a sharp decline in survival rates. They call for further research by stating: "*examining the characteristics of newly listed firms can provide interesting information about changes through time in the kinds of firms that are viable candidates for public equity financing*" This call by Fama and French (2004) serves as one of our main motivations. We are not aware of any paper that studies the fundamentals of IPO firms in markets outside the U.S.

We recognize the importance of capital markets in allocating resources and this function of capital markets depends on regulations that protect investors' rights, encourage investor participation and curb excessive volatility of stock prices. We study the evolving characteristics of new lists in a market that has progressed through several stages of regulatory reforms and development. India is particularly well suited to study capital allocation to IPO firms because there are four major time periods that coincide with different states of development of the capital market.

It has progressed from a poorly regulated regime in 1991 to one with sophisticated mechanisms for price discovery, trading, information production and monitoring of IPO proceeds in the recent years.

In particular, we use this unique setting to examine the profitability, market value, marginal Q, value added growth, survival rates and liquidity of new lists over the four regimes: 1991-1995, 1996-2000, 2001-2005 and 2006-2018. These periods coincide with (a) setting up of the Securities and Exchange Board of India, the stock market regulator (b) framing of investor protection guidelines, setting up of investment banks and adoption of book building (c) liberalization of investment by foreign institutional investors, online book building of IPOs that improve transparency (see Marisetty and Subrahmanyam, (2010); Clarke et *al.*, (2016)) and (d) reforms in the IPO process such as IPO grading, introduction of lead investors to lead the price setting process in IPOs[1], pre-opening trading in IPOs on the listing day to aid price discovery, provision of a platform to trade SME (small and medium enterprises) stocks and regulation of IPO proceeds. In Appendix A we present a summary of reforms initiated by the Securities Exchange Board of India.

Our endeavor in this paper is to compare regimes with little or no regulation (regimes 1 and 2) with those with extensive regulations (regimes 3 and 4). We do not study the impact of any particular regulation on the outcome variables. We compare different regimes. We posit that the regulatory changes directly affect outcome variables by weeding out unprofitable firms[2] or smaller firms[3]; through better price discovery[4]; by providing greater liquidity to freshly listed stocks[5] and by ensuring higher survival rates[6]. We study profitability, Q, marginal Q, value added growth, and survival rates for the following reasons. If more capital is invested in firms with higher profitability or industries with higher marginal Q and value-added growth, then we can infer that capital market reforms lead to improved allocation of capital and this may attract more investors to the market. Conversely, if firms are not adequately profitable, capital formation would suffer. Stock markets may affect economic activity through their liquidity. Many projects require a long-term

[1] In July 2009 the securities Exchange Board of India allowed a two-stage IPO process in which certain institutional investors can act as lead or anchor investors. Anchor investors are allotted shares on a discretionary basis and the price at which the allocation is made is disclosed by the lead investment bank one day before the opening of the offer to the public. This feature aids price discovery in the primary market. See Seth et al. (2019)

[2] Through IPO grading and analyst coverage of IPOs

[3] By directing smaller firms to the SME platform

[4] By allowing anchor investors to lead the price setting process

[5] Through pre-opening trading in IPOs that reduce market frictions

[6] Through stringent guidelines for issuing firms and underwriters

commitment of capital that investors may be unwilling to commit. Without liquid markets it would not be possible to delink the duration of the project and the investment horizon of the investor. More liquid stock markets direct investments to long-duration and more profitable projects, thereby improving the allocation of capital. Greater market liquidity implies more and better information. Liquidity measures may also provide important information about the state of the economy as well as market participants' expectations about future economic growth (Naes et *al.*, (2008)). Likewise, survival rates of firms entering the market also provide valuable information about the current and future states of the economy. While bankruptcy is a relatively infrequent outcome, firms may get delisted for a variety of reasons, including non-payment of listing fees or non-compliance with the securities laws.

By studying capital allocation to IPO firms, we contribute to the literature in several ways. First, prior research in law and finance shows that IPO activity depends on country level laws and regulations (Coffee (1999); Stulz (2009)). We assess the impact of capital market reforms on the level of IPO activity over the lifecycle of development over an 18-year period from 1991 to 2018. In particular, we address the following related questions:

- Do capital markets allocate more capital to firms with higher profitability, Q, marginal Q and value-added growth?
- Do improved stock market regulations result in higher probability of survival of IPO firms or improve liquidity in the after-market?

Second, there is anecdotal evidence to show that capital allocation could be severely distorted in capital markets. This is especially important in emerging markets where business groups operate internal capital markets, often at the cost of minority shareholders (Shleifer and Vishny (1997); Bertrand, Mehta and Mullainathan (2002)). If markets are efficient we would not need business groups to resort to debt and equity investments in group companies. According to a study by McKinsey and Company in the late 90s, the return on capital employed earned by Indian firms between 1993 and 1997 was 9.5% in the public sector and close to fifty percent of the top 100 companies earned less than the cost of capital[7]. The study indicated that highly capital-intensive industries received 79% of the equity investment and earned 11 % on it. The average

[7] This was reported in a national daily then, the reference to which is no longer available.

ROA of all Bombay Stock Exchange listed firms during 1993-1997 was 1.15% whereas the weighted average long-term borrowing rate was 15.34%[8].

Between 1992 and 1996, 4000 firms raised ₹86,000 b from the primary market in India. Of the 6200 firms listed on the Bombay stock Exchange, 3000 stocks were quoting below the face (par) value of ₹10 in 1998. Out of this, nearly 50 percent of the firms traded below ₹5. These statistics suggest considerable wealth loss to investors. Despite such experiences in India (and probably elsewhere), there is little research on the allocation of capital to IPO firms and whether financial market reforms aid better capital allocation. To the best of our knowledge we are the first ones to study this. IPOs provide a unique setting because shares of young firms are often difficult to value.

Wurgler (2000) examines the allocation of capital in financial markets in 65 countries and finds that countries with developed financial markets allocate capital more efficiently. This implies that as financial markets develop, the investment in growing industries increases and that in declining industries decreases. One reason for better capital allocation is strong minority investor rights (La Porta et *al.*, (1998); Wurgler (2000)). Strong investor rights can come from strong regulatory authorities. For instance, Jarrell (1981) and Simon (1989) suggest that in the U.S.A, investor protection became stronger with SEC regulations and this lowered the cost of capital to firms. Weak institutional environment retard stock markets as well as the financial system. We contribute this strand of literature by examining how regulatory reforms can affect not just the level of IPO activity but also firm survival after the IPO.

Third, apart from allocation of risk capital through mobilization of savings, risk pooling and sharing, stock markets also promote better governance and control by providing investors mechanisms for monitoring a firm's management (Tadesse (2004)). Better governance improves efficiency and productivity. Stock market reforms that promote financial market's functional capacity lead to better economic performance. The literature has documented positive relation between financial development and economic performance (Levine and Zevros (1998); Rajan and Zingales, (1998)). This suggests a positive role for capital markets and institutions.

[8] We calculated the average ROA from the Center for Monitoring Indian Economy's Prowess Database. Historical interest rates are available on the Reserve Bank of India's website https://dbie.rbi.org.in/BOE/OpenDocument/1608101729/OpenDocument/opendoc/openDocument.faces?logonSuccessful=true&shareId=2

Some economists argue that the lack of a vibrant stock market may not have a significant impact on growth (Morck, Shleifer and Vishny (1990)). But public equity markets are an important source of finance for many firms (Kim and Weisbach (2008); Gopalan and Gormley, (2013)). Allen et *al*. (2012) compare bank credit to the total market capitalization and find that India has a market denominated system and the dominance of financial markets over banks is more pronounced in India than in other developing countries. So, the relative importance of public markets cannot be understated. More importantly, as pointed out above, poorly functioning markets can fritter away savings and have a detrimental impact on long-run growth. For example, Greenwood and Smith (1997) show that large, liquid, and efficient stock markets can ease savings mobilization. By pooling private savings, stock markets can enlarge the set of feasible investment projects. Since some worthy projects require large capital investments, stock markets that aid resource mobilization can boost economic efficiency and accelerate long-run growth. Our analysis examines how government policies towards capital markets that consider the fundamental problems of capital markets such as enforcement, selection and incentives (Stiglitz (1989)) affect the allocation of capital to IPO firms that, in turn, can lead to an increase in economic activity over time.

Our main results are as follows. The number of firms that go public declines as primary market regulations become more stringent. However, the probability of failure of IPOs also declines and liquidity improves in the after-market. Our results suggest that security market reforms are not uniformly effective in directing investment to industries with higher marginal Q or value-added growth. The rest of the paper is as follows. Section 2 presents a discussion of the related literature. Data, methodology, and the descriptive statistics are presented in Section 3. Section 4 examines IPO volume, survival and liquidity of IPO firms during different regimes. In Section 5 we examine the relation between capital market reforms and the efficiency of capital allocation. Section 6 concludes.

2. Related Literature

Prior research suggests that better information can reduce the rate of return demanded by investors by enlarging the firm's investor base, enhanced risk sharing (Merton (1987)), and by reducing estimation risk (Barry and Brown (1985)). Information asymmetry discourages uninformed investors from participating in equity markets and also decreases the amount they bid for shares (Wurgler (2000)). Therefore, we expect capital allocation to improve during later

regimes (in our sample) due to reduction in information asymmetry. Several measures undertaken by SEBI such as the grading of IPOs by rating agencies and allowing IPO firms to allot shares on a discretionary basis to lead institutional investors before the IPO opens to the general public are intended to reduce information asymmetry between market participants.

Economists argue that financial markets and associated institutions improve the capital allocation process and thus contribute to economic growth. Efficient secondary market prices help investors distinguish good investments from bad ones on the basis of measures such as Tobin's Q. Agency theories argue that pressure from external investors, or managerial ownership, encourages managers to pursue value-maximizing investment policies (Jensen (1986)). Wurgler (2000) shows that financial markets appear to improve the allocation of capital. He shows that relative to financially undeveloped countries, developed countries boost investment in growing industries and cut investment in declining industries. He finds that the efficiency of capital allocation is also negatively correlated with the extent of state ownership in the economy and positively correlated with the degree of firm-specific movement in domestic stock returns and legal protection of investors. His findings provide insights on mechanisms by which financial markets improve capital allocation. In contrast, we investigate the efficiency of capital allocation in the context of IPO firms.

Doidge et *al*. (2013) show that financial globalization plays an important role in facilitating the growth in IPOs by non-U.S. firms. They document dramatic shifts in the IPO landscape around the world in the last two decades and show that U.S. IPOs have become less important and IPOs in markets outside the U.S. have become more important both in terms of counts and proceeds. We add to this literature by studying the link between capital market reforms and allocation of capital to IPO firms in an emerging market context.

Some papers have attempted to measure the efficiency of capital allocation for a single developing country (Wurgler (2000)). Authors of these papers estimate the variance of the expected marginal returns to capital (in some cases, marginal costs of capital) across industries, and compare this variance before and after a financial deregulation event. If the variance falls, it can be inferred that the liberalization encouraged flows of capital to equate marginal returns across industries. Our focus is on how capital market reforms are related to capital allocation efficiency over a long period of time in the context of IPOs.

3. Data, Methodology and Descriptive Statistics

Our sample consists of 4424 IPOs made during the period 1990-2018 in India. The data on IPO characteristics comes from the Prime IPO database, the standard source of information on IPOs in India. We collected firm level data on ROA, total assets, firm age, ownership and other variables from the Center for Monitoring Indian Economy's Prowess Database.

3.1. Variable Construction

A description of variables and data sources is provided in Appendix B. Here we discuss some of the important variables. Following, Fama and French (2004) we define profitability as the ratio of earnings before interest and after taxes to assets. *Tobin's Q*, defined as the ratio of market value of equity and market value of debt to the replacement cost of assets. Following Chung and Pruitt (1994) we calculate a proxy for *Tobin's Q*, which is defined as the ratio of market value of the firm to book value of total assets (measured annually), where market value of the firm is measured by the sum of market value of equity and book value of total liabilities. This measure has been used in similar studies by Morck et *al.*, (1988), Khanna and Palepu (2000), Villalonga and Raphael (2006), Lien and Li (2014).

Marginal Q is the coefficient in the regression of the change in the market value of a firm (scaled by a lagged value of its stock of capital goods) on an unexpected unit increase in its stock of capital goods (scaled by a lagged value of its stock of capital goods) and controls by 3-digit industry code using annual data from 1991 through 2018. Tangible assets are equal to the sum of real property, plant, and equipment, and inventory

Average Q is the three-digit industry average. The average Q for a given industry in a specified period is the sum of market values of all firms over the sum of their replacement costs of tangible assets.

Value Added Growth We follow the procedure adopted by Wurgler (2000) to assess the efficiency of the capital allocation process. He suggests that higher firm-level investment in industries with faster value-added growth is associated with greater efficiency in the capital allocation process. Therefore, we estimate the sensitivity of investment to the growth in value added (instead of marginal Q). Value added growth is computed as the natural log of the change in value added between year t and year t-1. Value added is defined as earnings before interest and taxes plus the cost of employees.

We split the study period into four parts: Regime 1 (1990-95), Regime 2 (1996-2000), Regime 3 (2001-2005) and Regime 4 (2006-2018) similar to Marisetty and Subrahmanyam (2010). These periods coincide with the different states of the Indian capital market starting from 1990. Regime 1 (1990-95) was an unregulated IPO period in the immediate aftermath of the economic liberalization program launched in 1990-1991. During this time, there were few pricing restrictions and most of the IPOs were by firms that attempted to profit from the opening up of the Indian economy. Regime 2 (1996-2000) was the initial period after the newly constituted securities regulator, Securities Exchange Board of India, began exercising regulatory oversight over the Indian securities market. At the beginning of this period, SEBI introduced price and founder lock-in restrictions and closely scrutinized the IPO market. Regime 3 (2001-2005) is the period after the introduction of the book-building process to the IPO market. This is also the period when foreign institutional investment was liberalized. Regime 4 (2006-2018) is the period during which SEBI introduced several new market features such as grading of IPOs by a credit rating agency, provision to enlist a lead institutional investor (anchor investors), setting up of the SME platform and pre-opening trading of IPOs on the listing day and price limits during the first 10 days of trading. In addition, new governance legislation (Clause 49 of the listing agreement) too was introduced to improve the quality of governance of public firms.

3.2.Descriptive Statistics

Table 1 reports the summary statistics of our sample. The statistics presented are for the four regimes outlined earlier. The average family ownership in family owned firms increased from 48% in regime 1 to 55.8% in regime 4. Firms that went public in later regimes were older, bigger, more profitable, and had higher market values. These firms also had higher marginal Q and value -added growth. Institutional ownership also rose across the four regimes.

Table 2 presents a statistical test of the differences in means between the four sample periods. We use the Tukey multiple comparison test, which compares differences between the means after adjusting for multiple testing. We test the mean difference of each group (i.e. regime) with the other groups. For instance, the first row shows the difference between the means of regime 1 IPOs and all other regimes. Likewise, we compare Tobin's Q, marginal Q, value added growth, firm size and market/book ratio of equity. The results suggest that firms that went public in regime 4, for example, were more profitable and had higher Q, marginal Q and value-added growth. They

were also bigger and had more growth opportunities. These results provide preliminary evidence to support our hypothesis that capital market development results in allocation of capital to better quality firms.

4. IPO Volume, Profitability, Survival and Liquidity

In the sections that follow we undertake multivariate analysis of IPO volume, firm survival, profitability and liquidity.

4.1. IPO Volume and Profitability

Since our focus is to evaluate the efficacy of security market regulations in regulating the type of firms that go public, we begin the analysis by plotting the number of firms that went public each year since 1991. We posit that when security market regulations are lax, firms with poor fundamentals too may go public only to get delisted later. In Figure 1 we plot annual listings. The graph shows that a record number of firms went public during 1990-1995. The level of IPO activity crashed during 1995-2000 because of the initiation of regulatory reforms. The increase in IPO activity after 2000 is more modest compared to the previous decade.

In Figure 2 we plot the number of IPOs that get delisted each year. The figure shows that the number of delisted firms increased during 1995-2000 and reached its peak around 2004. The rate at which firms got delisted remained moderate for a decade after that and has increased in the past few years.

We supplement this graphical evidence with a multivariate analysis after controlling for market and economic conditions. We use an OLS (Ordinary Least Squares) regression in which we control for stock market (index) returns, market valuations (market-to-book ratio) and economic conditions measured by the GDP growth rate (Dambra, Field and Gustafson (2015); Doidge, Karolyi, and Stulz, (2013)). The variable of interest is the regime dummy set equal to 1, 2, 3 and 4.

We measure IPO activity in two ways: 1) as the number of IPOs in each quarter as a percentage of public firms and 2) as the ratio of quarterly IPO proceeds and quarterly market capitalization of all domestic listed firms expressed as a percent. We use lagged index return estimated using closing quarterly index values. Index M/B ratio is calculated as the market capitalization of the index scaled by its book value. GDP growth rate is the quarterly percentage change in GDP for all the years. The regression includes industry fixed effects and quarter fixed effects. The results are presented in Table 3. The coefficients of regime 1 dummy and regime 2

dummy in column 1 are positive and statistically significant at the 1% level, indicating that the more firms went public in the first two regimes after controlling for market conditions. On the other hand, the coefficient of regime 3 dummy is significantly negative, suggesting that fewer firms went public in regime 3. The coefficients of Index M/B and GDP growth are significantly positive, which suggests that firms go public when the stock market valuations are high and economic conditions are good. The coefficient of lagged index return is significantly negative suggesting that fewer firms go public when index returns are high.

In column 2 the dependent variable is the ratio of quarterly IPO proceeds and quarterly market capitalization of all domestic listed firms [i.e. 100*(IPO proceeds/Market Capitalization)]. The coefficient of regime 1 dummy and regime 2 dummy are again positive and significant at the 1% level indicating that firms raised more capital in regimes 1 and 2. The coefficients of index returns and GDP growth rate are significantly positive, which suggests that firms raise more capital when the market returns are high and economic conditions are good. Our regressions have adjusted R^2 of 81%.

A related question is whether primary markets allocate more capital to more profitable firms or firms with more growth opportunities when the regulatory environment is more developed. In order to answer this question, we run a pooled OLS regression in which the variables of interest are the product of firm level profitability and regime dummy, and the product of Q and regime dummy. The dependent variable is net proceeds of an IPO scaled by the total amount of equity raised by all IPO firms in that year. We control for firm characteristics such as leverage (which measures financial risk), firm size (a proxy for asymmetric information), institutional monitoring, capital intensity, group affiliation status, and stock market and economic conditions. The regressions include industry and time fixed effects. The results of the pooled OLS regression are reported in Table 4.

The coefficient of ROA*regime 1 dummy is significantly negative, which implies that less profitable firms raised more capital in regime 1. This supports the notion that when capital market regulations are weak, firms with poor fundamentals too may raise (more) capital. However, the coefficients of the next three interaction variables are insignificant, which suggests that firm profitability is unrelated to the amount of capital raised.

It is also possible that IPO firms may be rapidly growing firms with growth options. They may not be highly profitable at the time of the IPO. To address this, in the next column we replicate

the regression with the interaction term- regime dummy * Q. Our results suggest that while firms with better growth opportunities raised more capital in regime 2, the same is not true of later regimes.

To summarize our results, we find mixed or limited support to the hypothesis that primary markets allocate more capital to more profitable firms or those with better growth opportunities as the stock market develops.

4.2.Firm Survival

In this sub-section we report the results of an ordered probit model to measure the likelihood of success (or failure) of the IPO after listing on the stock exchange. Our proxy for success (failure) is the current (as of March 2018) listing category on the Bombay Stock Exchange (BSE). The BSE classifies all listed firms into four quality categories, namely, A, B, T, and Z to provide a guidance to the investors. The classification is on the basis of factors such as market capitalization, trading volumes, profits, dividends, shareholding pattern, and some qualitative parameters. The A-category represents the best quality stocks in terms of size, liquidity and financial performance and the rest follow a hierarchical sequence, with the Z category representing firms that have violated BSE listing norms or have been declared bankrupt. In the ordered Probit model firms take the values 1 through 4 depending on the firms' current listing category (i.e. A, B, T and Z respectively). The ordered probit model is estimated as follows:

$$\textit{Prob (Failure)} = \beta_0 + \beta_1 \textit{(Regime 1 dummy)} + \beta_2 \textit{(Regime 2 dummy)} + \beta_3 \textit{(Regime 3 dummy)} + \beta_4 \textit{(Regime 4 dummy)} + \beta_5 \textit{(Family ownership)} + \beta_6 \textit{(Diversification dummy)} + \beta_7 \textit{(institutional shareholding)} + \beta_8 \textit{(Lag Index return)} + \beta_9 \textit{(Index market/book ratio)} + \beta_{10} \textit{(GDP growth)} \textit{Industry Fixed effects} + \varepsilon \quad (1)$$

We include the four regime dummies to examine whether firms that go public in later regimes last longer. Prior research by Marisetty and Subrahmanyam (2010) shows that family ownership results in lower probability of failure because founding families value survival more and therefore, may have conservative risk choices. Diversity is the number of four-digit SIC codes that the IPO firm operates in. Diversified firms may be better positioned to manage industry downturns and display less volatility of cash flows. Hence, the extent of diversification may be positively related to firm survival (Jain and Kini (2008)). On the other hand, capital allocation may

be distorted in diversified firms (Rajan, Servaes and Zingales (2000); Scharfstein and Stein, (2000)). This suggests that diversified IPO firms are more likely to fail. Firms that are subject to higher institutional monitoring may have a lower probability of failure. We take institutional shareholding as proxy for institutional monitoring. When economic conditions are poor, more firms may get delisted. Likewise, when stock markets are performing poorly in terms of returns and valuations, more firms may get delisted. We expect this for two reasons. First, stock market returns and valuations mirror economic outlook. When the economic outlook is bleak, more firms may get delisted. Second, when stock markets are poorly performing, firms may find it difficult to raise capital. This may affect investments. The result of our estimation is reported in Table 5.

We find that the coefficients of regime dummies 1 and 2 are significantly positive at the 1% level, which indicates that IPO firms that went public in the first two regimes were more likely to be categorized as B, T or Z. The coefficients of regime dummies 3 and 4 are insignificant indicating that firms that went public later were less likely to slip into B, T and Z categories. Our results suggest that as regulations become more stringent, it is less likely that IPO firms fail. The coefficients of family ownership, institutional shareholding and diversification are significantly negative. These results suggest firms are less likely to fail when they are owned by founding families, when institutional monitoring increases or when firms are diversified.

As an alternative to the ordered probit model we estimate a probit model in which the dependent variable is a dummy variable set equal to 1 if the firm is actually delisted and zero otherwise. The variables of interest are the regime dummies. We control for firm profitability, firm age, leverage, volatility of industry sales, GDP growth rate and Q. We also include industry and time fixed effects. Table 6 reports the regression results. Our analysis suggest that a significant number of firms were delisted in regime 1. The coefficient of family dummy is significantly negative implying that family firms are less likely to get delisted. The coefficients of regime dummies 2, 3 and 4 are insignificant, which suggests that firms that went public in later regimes were less likely to delist.

4.3.Liquidity

In the next step we investigate the impact of capital market development on the liquidity of IPOs in the after-market. To measure liquidity, we follow Kang and Zhang (2014) to estimate the modified Amihud illiquidity measure. Emerging markets such as India and China are often characterized by absence of trading in a large number of stocks on many days because to which

the original Amihud measure is unlikely to be a good measure for liquidity. The modified version incorporates both the original Amihud measure and the frequency of non-trading days in a month. The modified Amihud illiquidity measure i.e. *Adj ILLIQ* defined as the log transformation of the original Amihud illiquidity measure multiplied by the proportion of non-trading days in a month, t.

We estimate this as follows:

$$Adj\ ILLIQ_{i,m} = [\ \ln (1/N_{i,m}\sum_{t=1}^{Nt,m} |R_{i,t}| /Vol_{i.t})] * (1+ ZeroVol_{i,m}) \quad \textbf{(2)}$$

Where the $N_{i,m}$ is the number of non-zero trading volume days in a month t, $|R_{i,t}|$ is the absolute daily stock returns $_i$ in month t, $Vol_{i.t}$ is the Rupee trading volume (in millions) of stock $_i$ in month t and $ZeroVol_{i,m}$ is the percentage of zero-volume days in a month t. We take the natural log of the Amihud measure to account for extremely large values.

In the second step we estimate the following equation:

$$AdjILLIQ_{i,m} = \beta_0 + \beta_1 (\text{Regime 1}) + \beta_2 (\text{Regime 2}) + \beta_3 (\text{Regime 3}) ++ \beta_4 (\text{Regime 4}) + \beta_5 (\text{Firm size}) + \beta_6 (\text{Family dummy}) + \beta_7 (\text{Asset Tangibility}) + \beta_8\ \sigma(\text{Stock returns}) + \text{Time Fixed Effects} + \text{Industry Fixed effects} + \varepsilon \quad \textbf{(3)}$$

The results of our regression are in Table 7. The dependent variable is *Adj ILLIQ*. The explanatory variables include the natural log of market capitalization (a proxy for firm size), family dummy, asset tangibility (ratio of fixed assets to total assets) and standard deviation of stock returns in the year in which the IPO was made. Liquidity of smaller firms tends to vary as opposed to bigger firms (Chordia et. al, (2004)). Firms with less concentrated ownership often attract more number of liquidity traders in a stock (Holmstrom and Tirole (1993) and thus increases liquidity (Amihud, Mendelson and Uno (1999)). Conversely, firms with high concentrated ownership tend to have an adverse impact on the liquidity. Firms with more tangible assets are often characterized by lower information asymmetry as the payoffs are easily observable (Chung et al. (2010)). The regime dummy is set equal to 1, 2, 3 and 4 depending on the time period in which a firm went public.

We find that the coefficients of regime dummies 1 and 2 are significantly positive at 1% and 10% levels, which indicates that firms that went public in first two regimes were characterized by low liquidity in the after-market. The coefficient of regime dummy 3 is significantly negative

at 1% level indicating that liquidity improved substantially for firms that went public in regime 3. An online Book building process was introduced in regime 3 and the results suggest that the book building process led to reduced information asymmetry. During regime 4 certain restrictions were added to the book building process, which added to the cost of IPOs. These results are also consistent with Sherman and Titman's (2002) model that adding restrictions to book building process (such as allocating a portion of shares to small investors) can lead to an increase in the level of underpricing, and hence, inefficiency. The coefficients of family dummy, asset tangibility and standard deviation of stock returns are significantly positive. These results suggest that family owned firms are less liquid due to a high degree of ownership concentration. Similarly, firms with volatile stock returns are less liquid. This is consistent with prior studies. In unreported regressions we consider additional controls such as institutional ownership (a proxy for institutional monitoring), firm size and firm age. The results are qualitatively similar.

5. Capital Market Reforms and the Efficiency of Capital Allocation

In this section we present empirical evidence on whether capital allocation in the primary market is related to firm performance. Our goal is to examine whether the efficiency improves with reforms. We measure firm performance as marginal Q and value-added growth. We measure marginal Q for the industry and test if capital allocation to IPO firms is related to this industrywide measure of Q. Tobin's Q is measured as the ratio of market value and replacement value of assets. Researchers have devised numerous ways of measuring Q (Erickson and Whited (2006)). We follow the procedure in Chung and Pruitt (1994) as the inputs are easily available from a firm's financial and accounting information.

$$\text{Approximate } q = (\text{MVE} + \text{PS} + \text{DEBT})/\text{TA} \qquad \textbf{(4)}$$

where MVE is the product of a firm's share price and the number of common stock shares outstanding, PS is the liquidating value of the firm's outstanding preferred stock, DEBT is the value of the firm's short-term liabilities net of its short-term assets, plus the book value of the firm's long term debt, and TA is the book value of the total assets of the firm.

To estimate marginal Q, we follow the methodology in Durnev, Morck and Yeung (2004) and Faccio et *al*. (2016). We estimate the sensitivity of corporate investment to the industry's marginal (Tobin's) Q. We focus on the sensitivity to *marginal Q* as it measures the value created by the

investment decision. The marginal Q is measured at the industry level (3 digit SIC code) by regressing the ratio of change in market value of a firm scaled by prior year assets against the percent change in assets of the firm and the ratio of prior year firm value and asset value. The slope coefficient is estimated across all firms in the industry. We estimate the following equation:

$$\Delta V_{i,t} / A_{i,t-1} = \beta_0 + \beta_1 (\Delta A_{i,t} \backslash) / A_{i,t-1} + \beta_2 (V_{i,t-1}) / A_{i,t-1} \quad \textbf{(5)}$$

We define market value of the firm as the sum of market values of outstanding common shares of firm j, the value of preferred shares of firm *j* at the end of year *t* and the book values of firm *j*'s long-term and short-term debt at the time of IPO. We set the market values of current assets and property, plant and equipment at book value because IPO firms typically do not disclose data on historical values. Consequently, we cannot follow the exact procedure in Faccio et *al*. (2016) and Durnev, Morck and Yeung (2004).

In the second step we estimate the following equations:

$$[\Delta \text{Gross PPE}_{i,t} / \text{Total Fixed Assets}_{i,t-1}] = \alpha + \beta (q_t) + \gamma [\text{Cash Flow}_{i,t} / \text{Total Fixed Assets}_{i,t-1}] + \delta \text{ Regime Dummy}_{i,t} + \theta (q_t) (\text{Regime Dummy}_{i,t}) + U_{i,t} \quad \textbf{(6)}$$

$$[\Delta \text{Gross PPE}_{i,t} / \text{Total Fixed Assets}_{i,t-1}] = \alpha + \beta (q_t) + \gamma [\text{Cash Flow}_{i,t} / \text{Total Fixed Assets}_{i,t-1}] + \delta \text{ Regime Dummy}_{i,t} + \theta (q_t) (\text{Regime Dummy}_{i,t}) + \varphi (\text{controls}) + \text{Industry Fixed effects} + \text{Year Fixed effects} + U_{i,t} \quad \textbf{(7)}$$

Where Total Fixed Assets is the sum of tangible fixed assets, intangible assets, and other fixed assets net of depreciation; ΔGross $PPE_{i,t}$ is the annual change in net Total Fixed Assets after adding back depreciation; Cash Flow is net income plus depreciation; q_t represents the sensitivity of investments to growth opportunities. All else equal, the better the growth opportunities, higher should be the investment. In the above equation θ is our coefficient of interest. It measures the difference in investment sensitivity to growth opportunities between firms that go public during different regimes. If regime is irrelevant to investment efficiency, then $\theta = 0$. To estimate the above

equation, we consider controls such as ownership concentration, profitability, sales growth, firm size, firm age, and asset tangibility.

The other metric we consider is the value-added growth (Wrugler (2000); Faccio et *al.* (2016)). We estimate equation 3 by replacing marginal Q with value added growth. *Value added growth* is the natural log of the change in value added between the year in which the IPO is made and the previous year. Value added is defined as earnings before interest and taxes plus the cost of employees.

The result of our regression in which marginal Q is the variable of interest is reported in Table 8. The dependent variable is the ratio of capital expenditure relative to the capital stock. Capital expenditures are computed as the annual change in (net) total fixed assets plus depreciation. The capital stock is defined as the sum of tangible fixed assets plus intangible fixed assets plus other fixed assets. *Marginal Q* measures the change in the market value of a firm associated with an (unexpected) change in capital investment. We also include four regime dummies to identify whether more (less) capital is allocated to firms with higher marginal Q in later regimes. We find that the coefficient of regime 2 is positive while the coefficients of other three regime dummies are statistically insignificant. This suggests that security market reforms were not uniformly effective in later regimes. In Table 9 we report the results for value-added growth. The coefficients of the interaction of marginal q and regime dummies are all statistically insignificant. In summary, we find little support to the hypothesis that security market reforms aid the flow of investment to uses with higher investment efficiency.

5.1.Propensity Score Matching

It is possible that firms that go public early in the evolution of the stock market may have different characteristics and controlling for these alone may not be sufficient. We supplement our regression evidence with a PSM procedure. We identify a control sample of firms that went public in regime 1 and that exhibit no observable differences in characteristics relative to firms in regime 4. Each pair of matched firms are identical except for the time period in which they went public. We then compare differences in capital allocation efficiency between the two groups. We first estimate the probability that a firm with given characteristics is in regime 4. The probability is estimated as a function of ROA, natural log of total assets, sales growth, natural log of firm age, family ownership, (natural log of) IPO proceeds, institutional shareholding, and percentage of

independent directors on the board. The results are reported in Table 10. The difference in capital allocation efficiency (marginal Q) between regime 4 and regime 1 is again insignificant.

6. Concluding Comments

Although every text book on capital markets suggests that the job of the capital market is to direct investments to the most profitable uses, there is little evidence to prove that this is actually the case. We bridge this gap by examining Indian IPOs over the lifecycle of development of the primary market from 1991 to 2018. We find that when market regulations are weak, more firms go public and firms with poor fundamentals raise more capital. Over time, primary markets do not necessarily allocate more capital to firms with higher profitability or to those with more growth opportunities. However, the probability of failure declines and the liquidity of IPOs improves through time. Our results also suggest that capital market reforms are not uniformly effective in directing investment to firms with higher investment efficiency. Regulators should design policies that improve the efficiency of allocation of capital, which could spur economic growth.

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Appendix A: Timeline of Reforms Initiated by the Securities Exchange Board of India

1992	In May 1992, the Controller of Capital Issues was abolished, making access to the equity market much less restrictive, subject only to meeting certain technical conditions, and not to any formal approval process as had been the case earlier. The SEBI Act gives the regulator the power to make laws and regulations
1992	National Stock Exchange was established as the first electronically traded stock exchange
1995	Bombay Stock Exchange automated the system
SEBI (Merchant Banker) (Amendment) Regulations, 2006. Revised clause 49 corporate governance guidelines, 2006	Clause 49 is applicable to all companies listed on a stock exchange. This clause has both mandatory and non-mandatory provisions. The mandatory provision includes composition of the Board, role of audit committees, quarterly report on corporate governance, disclosure by the Audit committee, Board etc. whereas the non-mandatory provisions include constitution of remuneration committee, training and evaluation of Board members.
Issue of Capital and Disclosure Regulations 2009, amended in 2012	This regulation regulations relating to IPOs and Follow on Public Offers, guidelines for pricing of public offerings, conditions governing the transferability of founder's contribution, manner of disclosures in the offer document etc.
IPO Grading 2009	Under this mechanism, the Credit Rating Agencies (CRAs) registered with SEBI assign grades to initial public offerings (IPOs) of equity shares or other convertible securities. The assigned grades represent a relative assessment of the fundamentals of the IPO in relation to other listed securities.
Anchor Investors Regulation 2012	The term "anchor investor" refers to qualified institutional buyers (QIBs) who make an application for securities worth at least INR 100 million with a lock-in period of one month from the allotment date. The issuing firm can issue up to 30% of the allocation available to QIBs on a preferential basis to anchor investors one day before the IPO opens for other categories of investors. The price at

	which shares are allotted to anchor investors is publicly disclosed before the IPO opens for public subscription.
Pre-opening trading of IPOs 2012	SEBI introduced a one-hour pre-opening trading session from 9.00 am – 10.00 am through a call auction trading mechanism on the first day of listing of IPOs. Investors can enter bids to purchase or sell securities. Traders can enter or modify their orders within a 45-minute window between 9.00 am - 9.45 am. The process is stopped from 9.44 am – 9.45 am i.e. one minute to match the orders and to determine the opening price. This will be followed by a buffer window of 5 minutes for the subsequent continuous trading session that starts at 10.00 am
Listing and issue of capital by SMEs on the Institutional trading platform without IPO, 2013	Firms with less than INR 250 m of paid up capital are allowed to list on the SME platform in Bombay Stock Exchange and National Stock Exchange of India. There is no profitability requirement for these firms.

Appendix B: Description of Variables

Variables	Description	Source
ROA	EBITDA scaled by Total assets	CMIE Prowess database
Tobin Q	(Market value of equity + Book value of Preferred stock + Net current assets + long term assets) scaled by total assets	Same as above
Marginal Q	Change in the market value of a firm on an unexpected unit increase in its stock of capital goods	Same as above
Value-added growth	Sensitivity of investment to the growth in value added. Value added is defined as earnings before interest and taxes plus the cost of employees.	Same as above
Market-to-book ratio	Market value of equity divided by Book value of equity	Same as above
Firm size	Natural log of firm's total assets	Same as above
Firm age	No. of years of existence since inception	Same as above
Leverage	Book value of long-term debt scaled by total assets	Same as above
Institutional Shareholding	Percentage of shares held by institutional investors	Same as above
Family Shareholding	Percentage of shares held by the founding family	Same as above
IPO Proceeds	Amount realized from the IPO	Same as above
Index Return	Quarterly returns of the Bombay Stock Exchange Sensitive Index (Sensex)	Same as above
Index M/B ratio	Market-to-book ratio of the index (Sensex), measured annually	Same as above
Volatility of industry sales	S.D of industry sales for the previous 5 years	Same as above
Asset Tangibility	Fixed Assets scaled by total assets	Same as above
Cash Flow/Total Fixed Assets	Cash flow from operating activities scaled by total fixed assets	Same as above
σ(Stock returns)	Annualized standard deviation of monthly stock returns for each sample year	BSE website
Adj ILLIQ	[ln (1/Ni,m$\sum$t=1Nt,m |Ri,t| /$Vol_{i,t}$)] * (1+ ZeroVoli,m) the product of the natural log of original Amihud illiquidity measure	BSE website\Author computation

	and the proportion of non-trading days in a month t	
GDP growth rate	Growth rate of real per capita gross domestic product (GDP)	World Bank

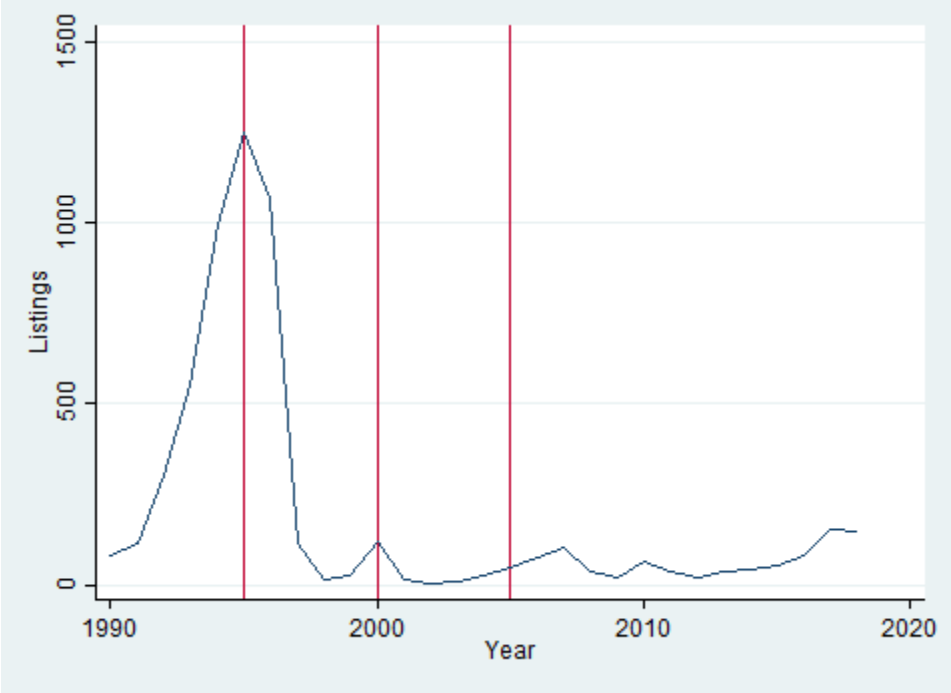

Figure 1: Annual Listing of IPOs

This figure plots the number of IPOs listed on the Bombay Stock Exchange from 1991 to 2018

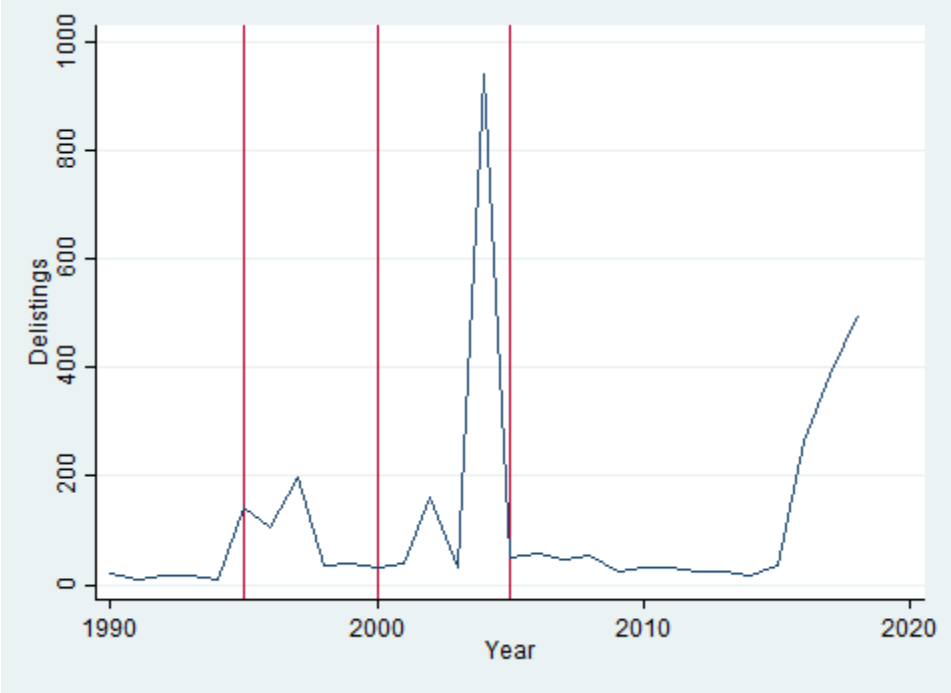

Figure 2: Annual Delisting of IPOs

This figure plots the number of firms that get delisted from the Bombay Stock Exchange from 1991 to 2018.

Table 1: Summary Statistics

This table reports the mean and median (in parenthesis) values of key variables used in our analysis. Our sample consists of 4424 IPOs conducted between 1991and 2018. Regime dummies are defined as follows. *Regime 1* for the years 1991-1995, *Regime 2* for 1996-2000, *Regime 3* for 2001-2005 and *Regime 4* for 2006-2018. Family shareholding is the percentage of shares held by the founding family. Other variables include percentage of shares held by institutional investors, ROA (EBITDA scaled by total assets), market-to-book ratio, leverage (book value of long-term debt divided by total assets) and Tobin Q (ratio of market value of the firm to book value of total assets). Marginal Q is measured as the change in firm value associated with an unexpected change in investments and value-added growth defined as the natural log of the change in the firm's value added between the year in which the IPO is made and the previous year. All the variables are defined in Appendix B.

	Regime 1	**Regime 2**	**Regime 3**	**Regime 4**
Family Shareholding (%)	48.03 (51.13)	44.19 (47.21)	41.73 (49.63)	55.86 (61.35)
Institutional Shareholding (%)	2.75 (0.03)	2.57 (0.00)	15.35 (7.32)	5.68 (0.00)
ROA	0.10 (0.09)	0.08 (0.07)	0.14 (0.13)	0.12 (0.12)
Firm size	4.96 (4.81)	4.89 (4.64)	7.65 (7.67)	7.20 (7.01)
Firm age	6.51 (4.00)	5.26 (4.00)	13.00 (11.00)	13.36 (11.00)
Tobin Q	1.96 (1.71)	2.23 (1.55)	2.98 (2.45)	2.51 (1.86)
Market-to-book ratio	1.84 (1.28)	1.50 (0.85)	3.39 (2.58)	2.61 (1.70)
Leverage	0.67 (0.66)	0.61 (0.57)	0.63 (0.63)	0.65 (0.65)
IPO Proceeds (INR. million)	86.08 (44.70)	95.16 (45.0)	1695.65 (466.85)	1627.25 (233.50)
Marginal Q	1.90 (1.62)	0.93 (0.53)	3.60 (3.08)	3.35 (1.67)
Value-Added growth	2.03 (2.12)	2.06 (1.99)	4.83 (4.72)	3.91 (3.80)

Table 2: One Way ANOVA Multiple Means Comparison Test for IPOs 1991-2018

This table reports the results of One-Way ANOVA test. The test statistic presented below relates to the differences between the means in different regimes based on the Tukey multiple comparison test. This test allows a comparison of the means simultaneously for multiple samples. For instance, sample mean of ROA of IPOs in regime 1 is first compared with the other three regimes. The asterisk superscripts ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels respectively. Refer to Appendix B for definition of variables.

	Regime 1	**Regime 2**	**Regime 3**	**Regime 4**
ROA				
Regime 1	-	-0.01***	0.05***	0.02***
		(-2.96)	(4.90)	(6.37)
Regime 2	-	-	0.06***	0.03***
			(5.89)	(7.07)
Regime 3	-	-	-	-0.02**
				(-2.49)
Regime 4	-	-	-	-
Tobin's Q				
Regime 1	-	0.27***	1.02***	0.55***
		(2.60)	(4.98)	(6.72)
Regime 2	-	-	0.75***	0.28**
			(3.38)	(2.33)
Regime 3	-	-	-	-0.47**
				(-2.22)
Regime 4	-	-	-	-
Marginal Q				
Regime 1	-	-0.97**	1.70	1.45***
		(-2.03)	(1.25)	(2.87)
Regime 2	-	-	2.67*	2.42***
			(1.91)	(4.00)
Regime 3	-	-	-	-0.25
				(-0.18)
Regime 4	-	-	-	-

Value-Added Growth

Regime 1	-	0.32	2.80***	1.88***
		(0.22)	(11.82)	(19.82)
Regime 2	-	-	2.77***	1.85***
			(10.45)	(12.19)
Regime 3	-	-	-	-0.92***
				(-3.78)
Regime 4	-	-	-	-

Firm Size

Regime 1	-	-0.07	2.69***	2.24***
		(-1.18)	(20.04)	(44.87)
Regime 2	-	-	2.76***	2.31***
			(19.34)	(33.15)
Regime 3	-	-	-	-0.45***
				(-3.28)
Regime 4	-	-	-	-

Market-to-Book ratio

Regime 1	-	-0.34**	1.55***	0.78***
		(-2.09)	(4.83)	(6.07)
Regime 2	-	-	1.89***	1.12***
			(5.43)	(6.00)
Regime 3	-	-	-	-0.77**
				(-2.32)
Regime 4	-	-	-	-

Table 3: IPO Volume

This table reports the results of OLS regressions. In column 1 the dependent variable is the yearly IPO activity (number of IPOs) scaled by the number of domestic listed firms in percentage terms [i.e. 100*(IPOs/Public firms)]. In column 2 the dependent variable is the ratio of yearly IPO proceeds and yearly market capitalization of all domestic listed firms [i.e. 100*(IPO proceeds/Market Capitalization)]. Regime dummies are defined as follows: *Regime 1* for the years 1991-1995, *Regime 2* for 1996-2000, *Regime 3* for 2001-2005 and *Regime 4* for 2006-2018. *Lag Index return* is the quarterly return on the Bombay Stock Exchange Sensitive Index (SENSEX) using yearly closing values. *Index M/B ratio* is calculated as the market capitalization of the SENSEX scaled by its book value. *GDP growth rate* is the yearly percentage change in GDP during the sample years. Refer to Appendix B for definition of variables. The regression includes industry and quarter fixed effects. The asterisk superscripts *, ** and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	IPOs/Public firms	IPO Proceeds/ Market Capitalization
Regime1	3.355***	37.915***
	(86.944)	(70.946)
Regime2	5.182***	85.408***
	(63.209)	(64.844)
Regime3	-0.334***	4.522
	(-2.785)	(1.303)
Regime4	-	-
Lag index return	-0.029***	0.234***
	(-24.774)	(10.793)
Index M/B	0.432***	-8.185***
	(16.806)	(-22.934)
GDP growth rate	0.351***	5.919***
	(11.864)	(15.563)
Intercept	-2.871***	1.887
	(-9.098)	(0.436)
Observations	4424	4424
Adj. R-squared	0.819	0.821
Quarter fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes

Table 4: Capital Allocation, Firm Profitability and Growth Opportunities

This table reports the results of pooled OLS regression. The dependent variable is net proceeds of an IPO scaled by the total amount of equity raised by all IPO firms in that year. Regime dummies are defined as follows: *Regime 1* for the years 1991-1995, *Regime 2* for 1996-2000, *Regime 3* for 2001-2005 and *Regime 4* for 2006-2018. *Lag Index return* is the quarterly return on the Bombay Stock Exchange Sensitive Index (SENSEX) using yearly closing values. *Index M/B ratio* is calculated as the market capitalization of the SENSEX scaled by its book value. *GDP growth rate* is the yearly percentage change in GDP during the sample years. Refer to Appendix B for a description of variables. The regression includes industry fixed effects. The asterisk superscripts *, ** and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Net proceeds/Total equity	
ROA	0.011	-
	(0.469)	
Regime 1	0.05	0.043
	(1.424)	(1.293)
Regime 2	0.011	-0.033
	(0.648)	(-1.625)
Regime 3	-0.016	-0.017
	(-0.364)	(-0.546)
Regime 4	-	-
ROA* Regime 1	-0.051**	-
	(-2.195)	
ROA* Regime 2	-0.065	-
	(-1.348)	
ROA* Regime 3	0.12	-
	(0.506)	
ROA* Regime 4	-0.033	-
	(-1.169)	
Leverage	-0.094***	-0.083***
	(-6.434)	(-5.258)
Firm size	0.019***	0.018***
	(8.607)	(8.385)
Capex/Sales	0.00***	0.00***
	(-3.792)	(-3.077)
Institutional Shareholdings (%)	0.00	0.00
	(-0.041)	(-0.735)
Group Affiliation dummy	0.003	0.003
	(0.958)	(0.969)
Lag index returns	0.00	0.00
	(0.81)	(0.811)
GDP	0.001	0.002
	(0.464)	(0.674)
Index M/B	-0.014	-0.011
	(-0.905)	(-0.78)
Tobin Q	-	0.001
		(0.771)

Q* Regime 1	-	-0.002
		(-1.404)
Q* Regime 2	-	0.025***
		(2.832)
Q* Regime 3	-	0.007
		(1.147)
Q* Regime 4	-	-
Intercept	-0.030	-0.044
	(-0.467)	(-0.689)
Observations	4424	4424
Adj. R-squared	0.524	0.578
Time Fixed Effects	Yes	Yes
Industry Fixed Effects	Yes	Yes

Table 5: Firm Survival Analysis

This table reports the results of an Ordered Probit model to measure the likelihood of success (failure) of the IPO after listing on the stock exchange. The proxy for success (failure) is the current (as of March 2018) listing category on the Bombay Stock Exchange (BSE). The BSE classifies all listed firms into four quality categories, namely, A, B, T and Z. The A category 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 this ordered probit model firms takes the values 1 through 4, if the firms' current listing bands are A, B, T and Z respectively. Regime dummies are defined for different time periods i.e. *Regime 1* for the years 1991-1995, *Regime 2* for 1996-2000, *Regime 3* for 2001-2005 and *Regime 4* for 2006-2018. *Lag Index return* is the quarterly return on the Bombay Stock Exchange Sensitive Index (SENSEX) using yearly closing values. *Index M/B ratio* is calculated as the market capitalization of the SENSEX scaled by its book value. *GDP growth rate* is the yearly percentage change in GDP during the sample years. Refer to Appendix B for definition of variables. The regression includes industry fixed effects. The asterisk superscripts *, ** and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Prob. (Failure)
Regime 1	0.309***
	(3.157)
Regime 2	0.175**
	(2.359)
Regime 3	0.092
	(1.549)
Regime 4	-
Family dummy	-0.758***
	(-4.903)
Institutional Shareholdings (%)	-0.059***
	(-11.284)
Diversification dummy	-0.484***
	(-4.650)
Lag index returns	-0.001
	(-0.459)
Index M/B	0.085**
	(2.108)
GDP growth rate	-0.007
	(-0.212)
Observations	4424
Pseudo R^2	0.199
Industry Fixed Effects	Yes

Table 6: Delisting Regression

This table presents the result of Probit regression. The dependent variable is the delisting dummy set equal to 1 if a firm is delisted in a given year and zero, otherwise. The regression includes year and industry fixed effects. All the variables are measured at the time of IPO. Refer to Appendix B for definition of variables. Standard errors are clustered at the firm level. The t-statistics are reported in parentheses. The asterisk superscripts ***, **, and * denote significance at the 1%, 5% and 10% levels respectively.

	Delisting dummy
Regime 1	7.348*
	(1.773)
Regime 2	4.000*
	(1.801)
Regime 3	-0.552
	(-0.552)
Regime 4	-
Family dummy	-3.676***
	(-20.726)
Firm Age	0.002
	(0.317)
Firm Size	0.036
	(0.751)
ROA	0.204
	(0.375)
Tobin Q	-0.070*
	(-1.809)
Leverage	0.405
	(1.294)
Volatility of industry sales	0.000
	(0.302)
GDP	0.998
	(1.411)
Intercept	-7.384
	(-1.491)
Observations	4424
Pseudo R^2	0.618
Time fixed effects	Yes
Industry fixed effects	Yes

Table 7: Regulatory Regimes and Liquidity

This table reports of OLS regression results. In columns 1 and 2, the dependent variable is AdjILLIQ i.e. the modified Amihud illiquidity measure as proposed by Kang and Zhang (2014). It is defined as $AdjILLIQi,m = [\ln (1/Ni,m \sum t=1 Nt,m \ |Ri,t| / Vol_{i,t})] * (1+ ZeroVoli,m)$, the product of the natural log of original Amihud illiquidity measure and the proportion of non-trading days in a month t. The controls include the natural log of market capitalization (proxy for firm size), firm age, family dummy, asset tangibility, volatility of stock returns and institutional ownership. All the independent variables are measured at the time of IPO. Refer to Appendix B for definition of variables. The regressions include year and industry fixed effects. Standard errors are clustered at the firm level. The t-statistics are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels.

	Adj_ILLIQ	
Regime 1	0.876***	0.785***
	(4.563)	(3.520)
Regime 2	0.806*	0.499
	(1.858)	(0.984)
Regime 3	-2.021***	-1.984***
	(-6.598)	(-5.897)
Regime 4	-	-
ln (Market Cap)	-0.603***	-0.664***
	(-18.181)	(-15.687)
Family Dummy	0.209*	0.060
	(1.871)	(0.312)
Asset Tangibility	0.479**	0.765**
	(2.020)	(2.425)
σ (Stock returns)	11.870***	11.406***
	(7.798)	(5.806)
Firm Age		-0.001
		(-0.177)
Institutional ownership (%)		0.017**
		(2.427)
Intercept	-13.452***	-13.153***
	(-26.196)	(-19.947)
Observations	4424	4424
Adj.R-squared	0.774	0.782
Time Fixed Effects	Yes	Yes
Industry Fixed Effects	Yes	Yes

Table 8: Regulatory Regimes and Marginal Q

This table reports the results of OLS regression. The dependent variable is the ratio of capital expenditure relative to the capital stock. Capital expenditures are computed as the annual change in (net) total fixed assets plus depreciation. The capital stock is defined as the sum of tangible fixed assets plus intangible fixed assets plus other fixed assets. *Marginal Q* measures the change in the market value of a firm associated with an (unexpected) change in capital investment. Refer to Appendix B for definition of variables. The regression includes fixed year and industry effects. Standard errors are clustered at the firm level. t-statistics are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels.

Marginal Q	0.088
	(1.406)
Regime1	-0.014
	(-0.001)
Regime2	1.154
	(0.538)
Regime3	-0.159
	(-0.051)
Regime4	-
Marginal Q*Regime1	1.139
	(0.678)
Marginal Q*Regime2	1.637***
	(24.558)
Marginal Q*Regime3	0.597
	(0.586)
Marginal Q*Regime4	-
Cash Flow/Total Fixed Assets	0.711
	(1.308)
Intercept	-2.693
	(-0.949)
Observations	4424
Adj. R-squared	0.123
Time Fixed effects	Yes
Industry Fixed effects	Yes

Table 9: Regulatory Regimes and Value-Added Growth

This table reports the results of OLS regression. The dependent variable is the ratio of capital expenditure relative to the capital stock. Capital expenditures are computed as the annual change in (net) total fixed assets plus depreciation. The capital stock is defined as the sum of tangible fixed assets plus intangible fixed assets plus other fixed assets. *Value added growth* is the natural log of the change in the firm's value added between the year in which the IPO is made and the previous year. Value added is defined as earnings before interest and taxes plus cost of employees. Refer to Appendix B for definition of variables. The regression includes fixed year and industry effects. Standard errors are clustered at the firm level. t-statistics are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels.

Value Added Growth	-0.043
	(-0.366)
Regime 1	2.462
	(1.609)
Regime 2	-0.350
	(-1.105)
Regime 3	0.168
	(0.393)
Regime 4	-
Value Added Growth* Regime 1	-0.018
	(-0.142)
Value Added Growth* Regime 2	0.054
	(0.403)
Value Added Growth* Regime 3	0.030
	(0.233)
Value Added Growth* Regime 4	-
Cash flow/Total Fixed Assets	0.049***
	(2.738)
Intercept	-0.093
	(-0.216)
Observations	4424
Adj. R-squared	0.070
Time Fixed effects	Yes
Industry Fixed effects	Yes

Table10: Propensity Score Matching

This table reports the results of PSM. The definition of capital allocation is as specified in the previous tables i.e. ratio of capital expenditure relative to the capital stock. Capital expenditures are computed as the annual change in (net) total fixed assets plus depreciation. Capital stock is defined as the sum of tangible fixed assets plus intangible fixed assets plus other fixed assets. This is the definition followed in Faccio et. al (2016). We estimate the propensities or probabilities using the regression of capital allocation in section 5. We use these propensities to match the firms that went public in regime 4 with the firms that went public in regime 1 and the difference in their capital allocation efficiency (Marginal Q). Refer to Appendix B for definition of variables.

	No. of Observations	Mean	Difference (Regime 4 - Regime 1)	p value of difference
Capital Allocation Efficiency (Regime 4)	538	0.97	0.43	1.10
Capital Allocation Efficiency (Regime 1)	555	0.54		