Liquidity in the Large:Evidence From an Exogenous Supply Shock *

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Abstract

The price impact of a large share sale has been a subject of scholarly investigation for over four decades. Since initiators of such trades are likely to be informed, the documented evidence regarding the impact of such share sales is likely due to endogenous information. We use a policy experiment to examine the price impact of an exogenous supply shock. In June 2010, the Securities and Exchange Board of India (SEBI), the Indian market regulator, stipulated that all listed non-government companies in India must have a minimum public shareholding of 25 percent and government companies must have a minimum public shareholding of 10 percent. 276 firms were affected by the regulation. Firms were given three years to comply with the new norms. The companies complied on different dates over the three-year window. We find that shares of companies where promoters sold shares in response to the regulation experience a negative excess return of 5.43 percent during the issue week and a negative excess return of 2.42 percent on the issue date. We find that the impact lasts for about 75 days before reversing itself fully. We rule out information-related explanations through a number of robustness checks. Our findings are consistent with a downward sloping demand curve for stocks.

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1 Introduction

Studies like Keim and Madhavan (1996) document the temporary price impact of block sales, which we call "liquidity in the small" as these capture transitory price effects due to, primarily, order book depth. Other studies like Scholes (1972) attempt to determine the price impact of a non-information-related supply shock, which we call "liquidity in the large" as they capture price effects due to a permanent shift in the supply curve. However, Scholes finds that the price impact of seasoned equity offerings is largely driven by information about the issuer. Given the confounding effects due to information as well as endogeneity issues, researchers have found it difficult to isolate the price impact of an exogenous supply shock. We attempt to document the price impact of a large sale of shares by examining an exogenous regulatory change that required a group of shareholders to reduce their stake in a company through a public sale of shares.

Classical asset pricing theories such as the Capital Asset Pricing Model (CAPM) assume that the value of a stock is the expected value of the future cash flows. If a stock deviates from its fundamental value, arbitrage actions ensure that the deviation is short-lived. The fundamental assumption here is that stocks have perfect substitutes and there are investors with the required resources to act quickly to correct any mispricing. In cases where there is no one perfect substitute for a stock, investors will be able to create a portfolio of assets with similar risk and return as the stock under consideration. Thus, as per traditional theories, even in situations where risk-return characteristics of a firm change, say due to implementation of a new project, investors will be able to construct a portfolio that mimics the changed risk and return characteristics of the stock.[1] These suggest that the demand curve for stocks, in the presence of perfect substitutes, is flat and any shock to supply or demand results in price changes that is very temporary in nature. However, empirically it has been observed that events that lead to an increased demand result in price increases and an increase in supply result in a reduction in prices. Researchers, starting with Scholes (1972), have tried to test if the observed price reactions are due to a downward sloping demand curve for stocks or due to a correlation between

[1]The idea of home-made leverage of Modigliani and Miller (1958) is in the same spirit.

information and change in demand or supply.

Kaul et al. (2000) note that an exogenous supply shock is an obvious way to test if the demand curve for stocks is downward sloping. An exogenous supply shock helps us observe if and how prices change along the demand curve without the demand itself changing. Supply shocks are rare and often face institutional restrictions. A supply shock in response to a regulatory change for different companies on different days is unlikely to be correlated with information. Hence, such an event can act as a natural experiment to test if the demand curves for stocks slope downwards. However, so far, researchers have not been able to identify such an exogenous supply shock. While Scholes (1972) and Mikkelson and Partch (1985) document a negative price reaction for large share sales, it is difficult to disentangle the impact of information from the slope of the demand curve in such cases. Specifically, Scholes (1972) finds that the extent of negative price reaction in response to the sale of additional shares depends upon the identity of the seller. Consequently, these results could also be attributed to the market inferring negative information about the seller.

Due to a lack of exogenous supply shocks, prior research uses demand shocks to determine the slope of the demand curve for stocks (e.g. Shleifer, 1986; Kaul et al., 2000). Ideally, a horizontal demand curve is not expected to move in response to an increased demand from some investors, say index funds. This is because a small increase in price, in the presence of perfect substitutes, is likely to attract short sellers. So any change in price in response to an increased demand is likely to be due to a downward sloping demand curve. It is important to note that stock prices change very frequently due to new information, which results in permanent shifts in the demand curve. These movements do not help us understand the slope of the demand curve.

The most commonly used exogenous demand shock is the inclusion of stocks in an index. These studies show that such inclusion results in positive abnormal returns for the stock. They attribute the positive price reaction to increased demand from index funds, which are now forced to buy the newly-included securities to continue to track the index. A positive reaction to increased demand implies a downward sloping demand

curve for stocks. Shleifer (1986) finds that the stocks that are added to the S&P 500 index earn positive abnormal returns at the announcement of the inclusion. Ruling out a number of alternative explanations, he postulates that the abnormal price reaction is a result of downward sloping demand curve. Even though Standard & Poor's claims that inclusion of a stock in the index does not certify high quality, researchers have shown that it does. For example, Dhillon and Johnson (1991) show that bond prices of companies in the S&P 500 index also increase on announcement of the stock's inclusion in the index. It is important to note that the bonds are not tracked by index funds and hence should not experience a price change on the stock's inclusion. Similarly, Jain (1987) shows that stocks that are included in supplementary indices, which are not tracked by index funds, also experience price increases on such inclusion.[2] These studies raise the question whether index inclusion is truly an exogenous demand shock.

Kaul et al. (2000) test the hypothesis of a downward sloping demand curve for stocks using a pre-announced weight adjustment of stocks in the Toronto Stock Exchange 300 index. This adjustment leads to an increased demand for some stocks in the index. They find that such stocks experience positive abnormal returns during the week of index adjustment relative to a sample of index stocks whose float did not change. They rule out a certification effect as the revision was announced well in advance and there was no new inclusion. However, some of their evidence is not consistent with a downward sloping demand curve. They find that the set of index stocks that experience a negative demand shock earn positive returns during the week of the index adjustment.[3]

Not all studies find results similar to Kaul et al. (2000). Biktimirov et al. (2004) examine the impact of inclusion of stocks in the Russell 2000 index. The main advantage of their setting is that the number of inclusions in the Russell 2000 index is far greater than those in the S&P 500 index. They find that the price impact of inclusion is purely

[2]Lynch and Mendenhall (1997) find positive abnormal returns around S&P 500 index inclusion announcement but negative abnormal returns around when the firm is actually included in the index. They conclude that these results are consistent with temporary price pressure as well as a downward-sloping demand curve. Beneish and Whaley (1996) also find that part of the price reaction to the announcement of S&P 500 index inclusion is transitory.

[3]Though the float for these stocks did not change, index funds would have sold shares in these stocks because weights must sum to one. This negative demand shock should have resulted, in the presence of a downward sloping demand curve, in negative returns.

transitory. Their findings support the price pressure hypothesis proposed by Harris and Gurel (1986). Therefore, it is fair to say that results from index inclusion have produced mixed results regarding downward sloping demand curves for stocks. Since Kaul et al. (2000) do not find a significant negative reaction for stocks whose weights were reduced and Biktimirov et al. (2004) find only transitory price impact the question as to whether the demand curve for stocks is downward sloping is still an open one.

On June 4, 2010, the Securities and Exchange board of India (SEBI), the Indian stock market regulator, mandated that all listed companies must have at least 25 percent public shareholding at all times.[4] This was set at 10 percent for public sector units (PSUs).[5,6] The stated purpose of this regulation was to ensure a dispersed shareholding structure. As per the SEBI order, such a structure is necessary to

a. Maintain a continuous market for listed securities

b. Provide liquidity to investors

c. Discover fair prices

It is important to note that SEBI did not react to any company- or promoter-specific information while arriving at these guidelines. Companies were given three years to comply with the regulation. Non-compliance would lead to restrictions on the dividend rights of the non-compliant companies' promoters. The directors of non-compliant companies were prohibited from holding new directorships in other companies. The SEBI order also specified the ways in which promoters could reduce their holdings to 75% or below. From the description of the event, it is clear that the affected companies experienced an

[4]Public shareholding is defined as non-promoter shareholding. We use the terms interchangeably in this paper.

[5]On June 19, 2014, SEBI announced that PSUs must bring their public shareholding also to at least 25% within three years

[6]In India, the term promoter does not have any legal definition. However, a large number of regulations use the term promoter. SEBI defines a promoter in the Disclosure and Investor Protection Guidelines, 2000 as follows:

1. The person or persons who are in overall control of the company.
2. The person or persons who are instrumental in the formulation of a plan or program pursuant to which the securities are offered to the public.
3. The person or persons named in the prospectus as promoters(s).

exogenous supply shock. Promoters of 276 companies were required to dilute their stake to comply with the new SEBI regulation.

We use the above natural experiment to test if the affected stocks experience a negative price reaction on the day the promoters reduce their holdings. The supply curve shifts to the right when promoters sell their stake to comply with SEBIs regulation. Our null hypothesis is that if the demand curve were horizontal, a shift in the supply curve should have no impact on stock prices. On the other hand, a downward sloping demand curve would cause a negative price reaction. Consistent with a downward sloping demand curve, we find that share sales by promoters of non-public sector units (public sector units; hereafter, PSUs) are associated with a negative cumulative abnormal return of 4.89% (11.00%) in the 11 days around the promoters' sale of their stake.[7] On the event day, the non-PSU (PSU) stocks experience a negative abnormal return of 1.88% (4.19%). The above numbers are statistically as well as economically significant. A majority of the negative CAR occurs between the issue date and the following week for all firms.

We rule out a number of alternate explanations for the price reaction around the sale of shares. First, the share sale was mandated by the regulators for reasons that have very little to do with company fundamentals. Second, we find a negative abnormal return of 0.58% on the day of SEBI's announcement of the minimum public shareholding (MPS) norms but the CAR in the 11 days around the announcement date is not significant. This shows that the price reaction on day 0 was temporary and not due to information. Further, the companies announce their intention to conduct the sale, on an average, about two weeks before the actual issuance but very few companies do so. The mean (median) abnormal return on the announcement date is an insignificant negative 1.30% (0.87%). The companies announce details of the issue a day or two before the actual sale. The mean abnormal return on the day after the announcement of the sale details is an insignificant negative 1.06%. Taken together, these results show that the sale of shares is not information event and any price reaction is purely due to an exogenous shift of

[7]PSUs are publicly-listed companies in which the Indian government owns a majority stake. In our sample, the government owns more that 90% prior to the share sale; in fact, the government owns more than 99% in most PSUs in our sample.

the supply curve. Third, unlike in Kaul et al. (2000), different companies sold shares on different dates as SEBI gave three years for companies to comply with the MPS norms. This reduces the possibility of other contemporaneous macroeconomic events driving our results. Fourth, the promoters were allowed to use different methods to comply with the regulation.[8] We find that the negative price reaction is limited only to those companies where there is an increase in supply of shares. In contrast, companies that issue bonus or rights shares to existing non-promoter shareholders in order to comply with the regulation do not experience any negative price reaction. Fifth, we rule out the price pressure hypothesis by examining the excess turnover around the sale date. The excess turnover reverts to zero within seven trading days of the sale. Sixth, our results remain unchanged even after excluding sample firms that had other material events around the sale date. Finally, since promoters reduce their stake in the company, the price reaction could be attributed to a change in the companys governance structure. Reduction of promoters take to 75% does not change the promoters control of the company or the governance structure. The only major change around 75% is the potential loss in the ability to introduce special resolutions if the promoters stake is below 75%. There are a few companies that reduced promoters stake to less than 75%. Excluding these from our sample does not change our results.

As the exogenous supply shock is not related to any information, we expect a reversal in prices in the long run. Keim and Madhavan (1996) show that, when looking at liquidity in the small, the temporary price impact is corrected within one trading day. Given the much larger size of the share sales, we expect that it takes longer than one day for prices to revert to their pre-event levels. We find that prices revert to their pre-event levels within 75 days of the event. This shows that it takes the market 75 days to adjust their demand schedules in response to the supply shock.

Finally, we estimate the determinants of the firm's CAR on the share sale date. As not all firms comply, we estimate a two-step Heckman model to correct for any selection bias. The coefficient estimate of the inverse Mills ratio in the second stage of the model

[8]Detailed discussion in section 2

is insignificant, which shows that there is no selection problem in our data. Further, we find that the abnormal return is negatively related to dilution stake and a PSU dummy. Promoters diluting a larger stake create a larger supply shock in the market and hence a larger negative price reaction. PSUs are highly-constrained and regulated firms and are likely to have a steeper demand curve, which results in a larger negative reaction for PSUs.

Our paper contributes to the literature on block sales in a number of ways. First, ours is the first paper to clearly disentangle the temporary and the permanent price impact and clearly show the temporary price impact of a supply shock. Second, we show that the demand curve for stocks indeed slopes down. To our knowledge, ours is the first paper to show the same using an exogenous supply shock. Finally, this is the first paper to clearly estimate the time required to undo the temporary price impact caused by a large supply shock. Thus findings in this paper have import for regulators, corporate decision makers, minority shareholders and of course researchers in this area.

The rest of the paper is organized as follows. Section 2 describes the event. Section 3 provides details regarding data sources and presents summary statistics. Section 4 describes our empirical methodology and discusses our results. We conduct some robustness tests in Section 5 and conclude in Section 6.

2 The Event

The Finance Ministry of the Government of India is of the view that in order to ensure efficient price discovery, it is important that company shares are widely held as excessive promoter holding leads to "undesirable" transactions and price manipulation. One of the objectives of the Securities Contract (Regulation) (SCR) Act of 1956 is to prevent "undesirable" transactions in securities. Therefore, a number of rules and regulations require a minimum float both at the time of initial listing and also for continued listing. SEBI is empowered to enforce the rules and regulations made in this regard.

2.1 History of the MPS regulation

1. Prior to 1993: Before September 1993, Rule 19 (2) (b) of the SCR Act required a minimum public offer of 60% of a company's issued capital to get listed on a recognized stock exchange. However, stock exchanges, with the prior approval of the Indian government, were allowed to grant exemptions to this rule and exemption were indeed granted on various grounds. The process of granting exemption was not all transparent. In the end, having a track record of profits became a sufficient reason for exemption.

2. September 1993: Rule 19 (2) (b) of SCR Act was amended on September 20, 1993 by which the minimum public offer by a company for getting listed on a stock exchange was brought down to 25% from the earlier norm of 60%. The stock exchanges no longer had discretion to grant exemptions to companies. The Indian government continued to have the power to grant exemptions. This was ostensibly done to encourage listing. However, this norm was reduced to 10% for information technology companies.

3. April 2000: The concessional limit of 10% was extended to the media, entertainment and telecommunications sectors.[9]

4. June 2010: SEBI notified that all listed companies must maintain a stipulated minimum public shareholding. The limit was set at 25% of issued capital for non-PSUs and 10% of issued capital for PSUs. Non-PSUs were given time until June 4, 2013 to comply with the regulations. PSUs were given time till August 31, 2013 to comply with the regulation.

2.2 Methods for diluting promoter stake

SEBI has approved the following methods for dilution of promoter shareholding to comply with the MPS norms:

[9]Interestingly, until 2000, the entire discussion on MPS norms was restricted to new issues and there was no proposal to change MPS norms for listed companies.

1. Issuance of shares to the public through a prospectus: This is akin to a seasoned equity offering and hence involves cumbersome procedures. None of the companies in our sample used this method.

2. Offer for sale (OFS) by promoters to the public: Here the promoters directly sell their shares to the public through the stock exchanges. On the OFS date, a separate window is opened for OFS trades. Investors may buy shares through this window. Promoters may fix a floor price. However, promoters need to issue a prospectus. The value of this method of compliance is that we know with certainty that the entire supply of shares sold through an OFS comes from the promoters.

3. Institutional private placement (IPP): Here the promoters are allowed to privately place their shares to qualified institutional investors.

4. Sales of shares by promoters through the secondary market.

5. Rights issue to shareholders with promoters foregoing their entitlement.

6. Bonus issue to shareholders with promoters foregoing their entitlement.[10]

It is important to note that the last method is disadvantageous to the promoters as they lose some stake in the company without realizing any proceeds i.e. there is a direct wealth transfer from the promoters to non-promoter shareholders. We find that these companies tried to comply with the MPS norms through the OFS route but did not find buyers in the market. Hence, they were forced to reduce promoter holdings through a bonus issue.

2.3 Penalties for non-compliance

Prior to the deadline in June 2013, SEBI announced penalties for not meeting the MPS norms by the deadline. These penalties include the following:

a. Freezing corporate benefits such as dividend, rights, bonus shares, stock split, voting rights, etc. for the promoter/promoter group of non-compliant companies: The freeze

[10]A bonus issue is similar to a stock dividend.

is applicable with respect to the excess of proportionate shareholding in respective companies. For this purpose, promoters' shareholding in excess of 3 times of public shareholding is considered as excess shareholding. It is important to note that this penalty leads to an actual loss to the promoter. For example, consider a company that continues to have a promoter shareholding of 90% even after the compliance deadline passes. In such a case, the promoters' shareholding for the purpose of dividend, bonus, and split will be determined to be 30% (three times the public shareholding of 10%). In contrast, if the promoters bring down their stake to 75%, then their claims on dividends will be proportional to their shareholding i.e 75%. Additionally, they would also realize the proceeds from selling their excess stake. Thus, promoters of dividend-paying companies are likely to be severely affected by the regulation.

b. Restriction on dealing in shares: The promoters/promoter group and directors of non-compliant companies are prohibited from buying, selling or otherwise dealing in the securities of their respective companies, either directly or indirectly, in any manner whatsoever, except for the purpose of complying with the MPS requirement.

c. Restrictions of directorships: The promoters/promoter group and directors of non-compliant companies are prohibited from holding any new position as a director in any listed company till such time these companies comply with the MPS norms. Promoters/directors of large companies are likely to have multiple directorship opportunities. Hence, such companies are more likely to be affected by this penalty.

However, these restrictions remain in force only during the period of non-compliance. As soon as a firm complies with the MPS norms, even after the deadline, these restrictions cease to exist.[11]

[11]In our sample, firms reduce promoter stake well after the June 2013 deadline.

3 Data and Summary Statistics

3.1 Data

We obtain data pertaining to promoter's stake sale from the National Stock Exchange of India (NSE) and the Bombay Stock Exchange (BSE) websites. The NSE and the BSE, the two premier stock exchanges of India, together account for more than 99% of equity market activity in India.[12] The data includes the date of each issue, percentage of promoter stake diluted, floor price, if any, and number of times the sale is subscribed, if applicable. We also obtain promoter shareholding data for all sample companies from the exchange websites. We supplement the event data from the exchange websites with event data from Prime database.[13]

Daily stock returns data is from the Center for Monitoring Indian Economy's (CMIE) Prowess database. It also provides the proportion of promoter shareholding in all Indian companies. We cross verify this data with the data obtained from the NSE and BSE websites and do not find any discrepancy.

We obtain information about the regulations from the SEBI website. Several notifications issued by SEBI, describe the regulatory history, current regulations, methods of compliance, penalties for non-compliance, etc. The SEBI website also provides names of companies that are suspended from trading. We also obtain information about the relevant event dates from the SEBI website.

We hand collect other relevant data. We manually search for the date of announcement of share sales by the promoters. For this purpose, we use the company announcement data maintained by www.moneycontrol.com, a premier investment portal maintained by the CNN-IBN group. We also hand collect information regarding earlier attempts made by promoters to sell shares.

[12]There are a number of regional exchanges but there is hardly any trading on these exchanges. Recently, a number of them have closed down due to their inability to meet new SEBI regulations for stock exchanges. The MCX-SX is a new stock exchange, which started trading equities in February 2013. It has a market share of less than 1 percent in equities.

[13]We verify the consistency of the data from the two sources. In case of a discrepancy in the data, we use data from the company filings and company news sections of www.moneycontrol.com to validate our data.

3.2 Summary statistics

Table 1 reports summary statistics for the entire Indian market and also the likely the impact of complying with the MPS norms. We report the numbers as of March 2010 as SEBI announced MPS norm on June 4, 2010. There are a total of 4,889 companies listed on the BSE,[14] 80 of which are PSUs. 276 companies are affected by SEBI's MPS norms, of which 15 are PSUs. 194 companies complied with the norms, of which 14 were PSUs.[15] The free-float market capitalization of PSUs (non-PSUs) is one-sixth (one-half) of their total market capitalization.[16] This shows that promoters hold a large fraction of shares in all Indian companies. PSUs (Non-PSUs) were required to sell stake worth Rs. 215 (235) billion, which accounts for 5.57% (1.02%) of their free-float market capitalization.

Table 2 shows the different methods used by firms to comply with MPS norms. 85 non-PSUs sold shares through an OFS, 10 through an IPP, 14 through a combination of bonus and rights issues, 12 through a direct secondary market sale, three through a combination of IPP and OFS, and two through a combination of bonus and OFS.[17] There were two firms which got delisted in response to MPS requirement and there were 10 other firms which got delisted for some other reason after SEBI announced the MPS norms. There are another 40 firms which has complied but no information regarding compliance method is available. Therefore, we have not included them in our analysis. Of the 14 PSUs, 7 did an OFS, one an IPP, and the remaining six transferred their excess shares to a special national investment fund (SNIF).[18]

Only OFS and direct secondary market sales provide a supply shock in the market due to large share sales. Other events are some form of private placement, where market

[14]Stocks listed on the NSE are a subset of those listed on the BSE. Hence, we use numbers from only the BSE to determine summary statistics.

[15]There is only one PSU firm (Haryana Financial) which has not complied because it has prepared a plan to wind up.

[16]We define free-float market capitalization as the value of shares not held by promoters and promoter groups as identified in Prowess. Since the Life Insurance Corporation of India (LIC) is a very large long-term investor, we also compute free-float market capitalization after excluding the value of shares held by the LIC.

[17]Inability to sell shares through an OFS is the main reason for opting for other methods of compliance.

[18]The SNIF was created with SEBI's approval. These six PSUs were sick and hardly had any liquidity. So selling their shares in the market to meet MPS norms would have been very difficult. The SNIF is maintained outside the Consolidated Fund of India and is managed by independent professional managers. The fund would sell shares in these six PSUs to the public over a five-year period.

does not receive an immediate supply shock. So we do a separate analysis for other events like IPP and bonus issuance. Some of the sample firms do not have data in Prowess and hence we exclude them. We end up with a sample of 6 PSUs with 7 issuances and 92 non-PSUs with 109 issuances for our main study. The number of issuances is larger than the number of firms as some firms do multiple issues to reduce promoter stake.

81 non-PSU firms in our sample do not comply with the regulation. Out of these 81, 33 companies have been suspended for violating listing norms. These are essentially defunct companies. Of the remaining firms, most have negative book-to-market ratios and/or have consistently been making losses over the past few years. These are sick companies. [19] Of the 81 firms, 5 firms attempted to meet the MPS norms but were able to only partially reduce promoter stake. These firms continue to be non-compliant. Table 3 compares the operating and financial characteristics of compliant to those of non-compliant firms. It is clear that compliant firms in terms of asset size, profitability, market capitalization, and sales are an order of magnitude (more than 10 times) larger than non-compliant firms. All these show that it is only the very small firms that fail to comply with the MPS norms. As we have noted previously, many of them are unable to sell shares through OFS.

When companies reduce promoter stakes to 75% or less, there is a large supply shock in the market, which is what we call "liquidity in the large". The impact of this shock is quite different from those seen in papers like Keim and Madhavan (1996), which we call "liquidity in the small". To show that the two are inherently different from each other, we show the distribution of the different ways through which companies reduce their promoter stake across different Amihud illiquidity quintiles. If a stock is illiquid (as per the Amihud measure) and cannot absorb a large supply shock, the company may try to avoid an OFS and use one of the other methods to reduce promoter stake. If "liquidity in the small" is related to 'liquidity in the large", we expect more liquid firms to do an OFS and less liquid firms avoid OFS. Table 4 shows the distribution of the different methods across the different Amihud measure quintiles. We find that the number of OFS are

[19]Stringent labor laws in India make bankruptcy a very costly exercise. Hence, companies continue to operate even it is desirable to liquidate or restructure.

spread fairly uniformly across the different quintiles. The other methods are also fairly uniformly distributed across the different quintiles. This shows that the price effects due to a large exogenous supply shock are different from those due to the price effects due to block sales.

4 Empirical Methodology and Results

4.1 Event study methodology

We use a standard market model to estimate abnormal returns. The CNX Nifty index proxies for the market index. Day 0 is either the SEBI announcement date, the company's announcement date, or the date of issuance of shares. We use returns from Day -170 to Day -21 to estimate the parameters of the market model. We estimate the parameters only for those stocks that trade for at least 120 days during the estimation period. We add this filter in order to avoid the possibility of our results being driven extreme values generated by thinly traded stocks. We exclude returns from Day -20 to Day -6 from our analysis. Our event period starts from Day -5. On each day of the event period, the abnormal return is the difference between the actual returns and the predicted returns from the market model. We cumulate these daily abnormal returns over different windows to estimate the price reaction to share issuance.

For computing t-statistics, we use the method specified by Boehmer et al. (1991). This method allows for the possibility of event-induced variance shift by taking into account information from both the estimation and event windows. The test uses standardized abnormal returns rather than abnormal returns as in the ordinary cross-sectional tests. Since a number of events happened close to the June 2013 deadline, we also adjust t-statistics to take into account cross-correlation due to event-date clustering using the methodology described in Kolari and Pynnönen (2010).

4.2 Reaction around OFS date

The CARs around the OFS dates are in Table 5. If the demand curve slopes downwards, we expect to see a negative price reaction around the OFS date. On the other hand, if the demand curve is flat, there should be no price reaction. In column 7 and 8, we report mean and median value of daily abnormal returns from day -5 to +5 where day 0 is the issue date. There is no confusion here regarding day 0. This is because the issue opens at market open on day 0 and remains opens until market close. Shares of non-PSUs (PSUs) experience a negative abnormal return of 1.88% (4.19%) on the day of issue of shares. This result is statistically significant at the 1% level for non-PSUs but not for PSUs. The insignificant abnormal return for PSUs is likely due to the small number of PSUs that do an OFS. However, the direction is still consistent with a downward sloping demand curve.

In column 3 and 4, we report the CARs between day -5 and +5 and the associated significance in column 5 and 6. CARs from day -5 to day -1 are not statistically significant. However, once we include day 0, the cumulative abnormal returns become negative and highly significant. The CAR from day -5 to day +5 for non-PSUs (PSUs) is -4.89% (-11.00%). Most of this return is realized between day 0 and day 5. A large decline in stock price around the OFS date supports the view that demand curves for stocks indeed slope downwards.

Some of the firms in our sample reduce promoter stake through multiple OFS. Through each OFS, the promoters reduce their stake by a little. Treating these as separate events would understate the true price impact of promoters reducing their stake to 75% or lower. So for such firms, we aggregate the abnormal returns and CARs across all events. The firm-by-firm abnormal returns and CARs around OFS are in Table 6. As expected the magnitude of abnormal returns and CARs are larger when we aggregate the events for each firm. The 11-day CAR for non-PSUs (PSUs) is -5.51% (-13.40%). The CARs are economically and statistically significant for non-PSUs. Given the small sample of PSUs, our results continue to be statistically insignificant for PSUs but the sign of CAR is consistent with a downward sloping demand curve.

As a robustness check, to ensure that the results are not driven by any other firm-specific news around the OFS, we repeat our analysis after excluding such OFS events.[20] These results are in Table 7. There are no confounding news events around PSUs and hence Table 7 applies only to non-PSUs. The mean CAR becomes more negative after excluding events with confounding news events around the OFS date. The mean (median) 11-day CAR is a highly significant -6.43% (-4.40%).

In some cases, the promoter stake after an OFS is less than 75%. This results in the loss of the promoter's ability to introduce special resolution in board meetings on her own. An alternate explanation for the negative price around OFS is that may be the market prices this ability and there is a negative price reaction when the promoter loses this power. To exclude this as an alternate explanation for the negative price reaction, we include only firms in which the promoters' stake was exactly 75% after the OFS. Results from this analysis are in Table 8. The results do not change. The mean (median) 11-day CAR is a highly significant -4.52% (-3.35%), with only the mean abnormal return on Day 0 being statistically significant.

The statistically negative 11-day CAR supports our hypothesis that the demand curve for stocks is indeed downward sloping. This result is robust even excluding events with confounding events around the OFS date and firms that reduce promoter stake to less than 75%.

4.3 Determinants of CAR around OFS

Next, we examine the determinants of the CARs around OFS. Since some firms do not comply with the MPS norms, we estimate two-stage Heckman correction model. In the first stage, we estimate the likelihood of firms complying with the MPS norms. In the second stage, we identify the determinants of CAR after correcting for any endogeneity using the inverse Mills ratio.

[20] We search Bloomberg for any news events around the OFS date for each event and exclude an event from our sample if we find non-zero news events during the 11-day window around the OFS date.

We estimate the following two-stage Heckman model:

$$Pr(Compliance = 1) = \beta_0 + \beta_1 \text{ Total assets} \tag{1}$$

$$\begin{aligned} CAR = \alpha_0 &+ \alpha_1 \text{ PB} + \alpha_2 \text{ RMSE} + \alpha_3 \text{ Dilution fraction} \\ &+ \alpha_4 \text{ PSU dummy} + \alpha_5 \text{ F\&O dummy} \\ &+ \alpha_6 \text{ Inverse Mills Ratio} + \varepsilon, \end{aligned} \tag{2}$$

where Total assets is the company's total assets as of March 2012, PB is the company's price-to-book ratio as of March 2012, RMSE is the root mean square error from the regression of the firm's return on three matched stocks as outlined in Wurgler and Zhuravskaya (2002), Dilution fraction is the distance of promoters' stake from 75%, F&O dummy takes a value of 1 for firms in the derivatives segment, and Inverse Mills Ratio comes from the first stage model. The dependent variable in the first-stage takes a value of 1 for compliant firms. The dependent variable in the second stage is one of the abnormal return on Day 0, the CAR from Day 0 to +1, and the CAR from Day 0 to +2. We include the RMSE measure as firms with less perfect substitutes are likely to have steeper demand curves, leading to more negative CARs.

Estimates of the Heckman model are in Table 9. Consistent with the summary statistics in Table 3, larger firms are more likely to comply with the MPS norms. In the second stage, firms higher price-to-book ratios have greater negative CAR. Consistent with Wurgler and Zhuravskaya (2002), we find that firms with higher RMSE (less perfect substitutes) have more negative CARs and hence steeper demand curves.

4.4 Price reversal

While there is a negative price reaction around OFS dates, there is no new information about the firms. Hence, we expect prices to revert eventually. This will happen as investors in the market adjust their demand in response to the supply shock. It is not clear how long this should take. Keim and Madhavan (1996) show that the temporary price impact lasts for about one day. Since these supply shocks are typically larger than

block sales, we expect the price reversal to take longer than one day.

We follow Kaul et al. (2000) and estimate the following cross-sectional regression with T taking values from 1 to 130:

$$CAR_{1-T,j} = \alpha + \beta AR_{0,j} + \varepsilon_{1-T,j} \tag{3}$$

Our null hypothesis is $\beta = -1$, which implies that as prices revert to pre-event levels within T days of the event. We report the results in Table 10. Each row presents results for estimating the above regression for a different value of T. For example, row 2 tests if the CAR from day +1 to day +2 offsets the abnormal returns on day 0. In column 3, we report the estimate of β. In column 4, we report the p-values for testing $\beta = 0$ and in column 5 we report the p-values for testing $\beta = -1$.

We reject the null hypothesis that $\beta = -1$ for up to 70 days after the OFS. After that we fail to reject the null for up to 130 days after the OFS data. This suggests that prices revert to their pre-OFS levels around 75 days after the OFS and stays at that level after that.

Harris and Gurel (1986) show that when there is a liquidity shock, liquidity providers demand additional compensation in the form of increased expected return. This leads to higher (lower) share prices during demand (supply) shocks as sellers (buyers) supply at (demand) higher (lower) prices. In our case, promoters' sale of excess shares (to meet MPS norms) leads to a supply shock. The consequent price decrease could be due to price pressure. In order to rule out the price pressure hypothesis as an alternate explanation for the price decrease around the issuance, we use a method similar to that in Kaul et al. (2000). Specifically, we examine how turnover changes around the issue date. When promoters reduce their excess stake to meet the MPS norms, the supply shock increases the stock's turnover. Once all traders have rebalanced their portfolios in response to the supply shock, turnover should revert back to normal levels. Given that that stock prices do not revert to normal levels even 20 days after the issue date, if turnover reverts to normal before 20 days, then it rules out the price pressure hypothesis. However, if turnover also does not revert to normal levels by day +20, then we cannot rule out the

fact that the price reaction is on account of price pressure.

We define daily turnover as the natural logarithm of the ratio of daily volume to the number of shares outstanding.[21] Our estimation period is the same as the one we used for the price reaction analysis i.e. from day -170 to day -21 relative to the issue date with at least 120 days of non-missing turnover. We determine the median daily turnover over the estimation period for each issuance. We then calculate the daily turnover on each day of the event window starting on day -5 before the issue date until day +20. The excess turnover on each day of the event period is the difference between the daily turnover and the median daily turnover over the estimation period.

Results from excess turnover analysis are in Table 11. We present both the mean and median excess turnovers. The excess turnovers are statistically significant between day -1 and day +7. The highest excess turnover is on day 0, the issue date. The mean (median) excess turnover is 1.777 (1.67). The t-stat (W-stat) is also the highest for day 0. This is consistent with the supply shock affecting turnover on the issue date. After day +7, the excess turnover is largely insignificant. This shows the temporary shock is absorbed within seven days of the share issues while prices revert around 75 days after the event. This is consistent with the price reaction around the OFS date not being due to price pressure as well as the subsequent price reversion not being due to the easing of the price pressure.

5 Robustness Tests

In this section, we conduct a series of tests that attempt to rule out the possibility that the MPS norms revealed some new information.

[21] Ajinkya and Jain (1989) find extreme skewness and kurtosis in turnover when it is defined simply as the ratio of daily volume to the number of shares outstanding. This violates the normality assumption. Hence, they suggest using a log transformation, which results in skewness and kurtosis closer to a normal distribution.

5.1 Reaction to SEBI's announcement of MPS norms

We examine if the issue of shares by companies to comply with the MPS norms is an information event. To test for this, we examine CARs around SEBI's announcement of MPS norms (in this subsection) and companies' announcement of the issue (next subsection). SEBI announced the MPS norms on June 4, 2010. All non-PSUs were required to maintain at least 25% non-promoter holding. All PSUs were required to maintain at least 10% non-promoter shareholding. SEBI fixed a deadline of June 4, 2013 for compliance for non-PSUs and a deadline of August 31, 2013 for PSUs.

It is unclear how prices would change around SEBI's announcement of the regulation in June 2010. If the announcement conveys information about the improved liquidity of stocks due to the higher float, we should see a positive reaction in the stock price of firms affected by the regulation. If the regulation has no information content, then we are unlikely to see any significant price reaction on the part of the affected stocks. The abnormal return results are in Table 12. We report mean and median value of CAR in column 3 and column 4 and similar values for daily abnormal returns in column 7 and column 8. The mean abnormal return on the day of SEBI's notification is a statistically significant -0.58%. However, this reverses by Day +5. CAR from day -5 to +5 is a statistically insignificant 0.48%. There appears to be some temporary price pressure, which reverses by the end of day +5. This reversal rules out the possibility of any information shock, positive or negative, from SEBI's announcement of the MPS norms.

5.2 Reaction to company's announcement of issuance

Companies were given three years to comply with the MPS norms. Different companies reduced promoters' stake on different dates during this period. Companies typically announce the exact date of sale of shares a couple of week before issuance. If there is any information in the promoters' sale of shares, then the price reaction should be on the day of announcement of the issue and not on the day of issue. Similar to the market reaction to seasoned equity offerings (e.g. Scholes (1972)), we would expect a negative reaction to this announcement as the market infers that the promoters are selling their stake because

the stock is overpriced. As very few firms actually announce their intention to conduct an OFS, we do not report these results as they lack power. The mean (median) Day 0 abnormal return is a negative 1.30% (0.87%).

Companies also announce the details of the OFS a day or two before the OFS. These details include the number of shares being sold, floor price, if any, and whether the OFS based on a single price or price priority. We examine the CARs around these days, which are in Table 13. The mean CAR from Day -5 to +1 is a statistically insignificant -1.08%. We do not examine CARs beyond Day +1 as almost all firms complete the OFS by Day +2. Taken together, the CARs around the company's announcement of the intention to conduct an OFS and around the announcement of the details of the OFS show that these do not reveal any information about the firm. So price reactions from around the OFS are entirely due to an exogenous shift in the supply curve.

5.3 Other types of events

It is possible that the dilution of promoter stake conveys some negative information about the firms. As a further robustness check, we examine CARs around two other ways in which companies reduced promoter stake, namely, bonus issues and IPP. In a bonus issue, there is a direct wealth transfer from promoters to outside shareholders. So if there is no negative information signaled by promoter dilution, we expect a positive price reaction to bonus issues. On the other hand, despite a wealth transfer, if the bonus issue signals negative information, we could observe a negative price reaction.

In an IPP, the promoters sell their shares directly to qualified institutional buyers. It is not clear if these buyers sell their stake immediately. So we do not expect any price change around IPP. However, if there is negative information conveyed by the IPP, we should observe a negative price reaction.

CAR results around bonus issues and IPPs are in Tables 14 and 15. Given the small sample size, we do not find any significant CARs around bonus issues. However, the sign of the CARs are positive, which is consistent with a wealth transfer promoters to outside shareholders. The mean and median abnormal returns on Day 0 are statistically

and economically significant 14.70% and 8.27%, respectively. This is also consistent with the wealth transfer effect. For IPP, we do not find any statistically or economically significant CAR or abnormal returns. It appears that the institutions that buy shares from the promoters through an IPP do not sell their shares immediately. Our results suggest that there is no information related being released when promoters sell their stake to comply with the MPS norms.

6 Conclusions

We estimate the temporary price impact created by a large sale of shares using a policy experiment. Using this experiment we also test the existence of a downward sloping demand curve. Scholes (1972) raises an important question: whether stocks are "unique works of art" or abstract claims on residual cash flows with certain risk and return characteristics. The question is important because if stocks turn out be "unique works of art" then many of the assumptions made by the classical asset pricing theories have to be re-examined. Corporate managers, in the real world investment decision making, will have to consider the possibility that observed share prices might have been influenced by market forces. Under these circumstances, managers will also have to consider the possibility of their corporate action of dealing in shares themselves influencing prices permanently.

Given this background financial economists have tried to answer this question. It is straight forward to see that the best way to test the slope of demand curve is to shock the supply keeping demand constant. In such a case, a researcher can observe movement along the demand curve. So far scholars have not been able to identify a supply shock which is free from potential information effects. This led scholars to use the second best: i.e demand shocks. Addition of a stock to an index has been used in several studies as an exogenous demand shock. However such studies have produced mixed results, finding support for both demand curves sloping down hypothesis as well as price pressure hypothesis. Index inclusion itself has been shown to be a certification of quality.

In this study, we test the hypothesis using an exogenous supply shock: SEBI issued an order that required non-compliant companies to reduce their promoter stake to 75%. The event is a result of regulator's desire to improve market liquidity and had nothing to do with any company-specific information. We document a significant decline in share prices on the date of share sale by the promoters. We rule out a number of alternate information-related explanations as well as temporary price pressure effects. We also observe that prices revert to their pre-event levels within 75 days of the event. Taken together, the evidence supports our hypothesis that the demand curve for stocks indeed slopes downwards.

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Table 1: Indian market overview

This table presents an overview of Indian market, the number of PSU/non-PSU firms that were affected by the MPS norms and the expected supply shock if all firms complied with the MPS norms. Market capitalization data is as of March 2010 and is in billions of rupees. Total supply shock in billions of rupees is the total value of shares of all firms that needed to be sold to the public to comply with the MPS norms.

	PSUs	Non-PSUs
Number of listed firms	80	4809
Number of firms affected by SEBI regulation	15	261
Percentage of firms affected	18.75%	5.43%
Number of firms that comply	14	180
Percentage of firms that comply	93.33%	68.97%
Total market capitalization	17,462.08	44,190.12
Floating market capitalization	3,856.92	23,056.14
Floating market capitalization excluding LIC	3,119.75	20,729.27
Total supply shock	214.93	234.76
Total supply shock/Floating market capitalization	5.57%	1.02%
Total supply shock/Floating market capitalization excluding LIC	6.89%	1.13%
Total supply shock/Floating market capitalization of affected firms	136.89%	21.32%

Table 2: Sample selection

The table below shows the different methods used by firms to comply with MPS norms

	PSUs		Non-PSUs	
	Firms	Events	Firms	Events
Total Firms	15		261	
(1) Compliant Firms	14		180	
(a) OFS	7	8	84	98
Price Priority	6		69	
Single Clearing Price			15	
(b) IPP	1	1	10	10
(c) Bonus/Rights			14	14
(d) Secondary Markets - Single Day			3	3
(e) Secondary Markets - Multiple days (1 week-3 months)			9	
(f) IPP + OFS			3	3
(g) Bonus + OFS			2	5
(h) OFS - Multiple Days			1	
(i) Employees stock purchase scheme/OFS to employees			2	
(j) Firm got delisted in response to MPS requirement			2	
(k) Reclassification from promoters to Non-promoters			1	
(l) Converting interest free loan into related party transaction			1	
(m) Firm got delisted because of some other reasons			10	
(n) Firm got acquired/merged			2	
(o) Compliant firm - No information available about event			40	
(p) Compliant firm - Dilution was done for funding requirements			2	
(q) Special national investment fund (SNIF)	6			
(2) Non-compliant firms even after OFS			5	6
(3) Other Non-compliant Firms	1		76	

Table 3: Summary statistics

This table presents summary statistics of compliant as well as non-compliant non-PSU firms. We report the numbers as on March 31, 2012. MPS norms were introduced in the year 2010. Column 2 to 4 report summary statistics for those firms that subsequently complied with the SEBI minimum public shareholding norm. In column 6 to 8, we report the same for non-compliant firms. We report the number of observations, mean, standard deviation, and median values of all variables. Columns 9 and 10, we report the results of mean and median comparison tests. Number of observation varies due to unavailability of data. Sales, total assets, EBITDA and market capitalization are reported in millions of rupees while shares outstanding is in millions.

	Compliant Firms				Non-compliant Firms				Mean Comparison Test	Median Comparison Test
Variable	N	Mean	Median	Std. Dev.	N	Mean	Median	Std. Dev.	p-value	p-value
Sales	112	21,041.19	4,150.50	73,371.49	54	2,142.80	529.95	4,218.53	0.008	0.000
Assets	128	36,406.38	4,986.55	78,906.95	67	2,706.22	408.20	8,516.19	0.000	0.000
PBDITA	127	3,688.64	620.00	8,658.21	67	286.29	18.20	962.77	0.000	0.000
PB	123	0.98	1.99	17.85	53	-4.45	0.50	49.51	0.409	0.000
Shares Outstanding	127	278.90	29.50	565.25	58	32.53	5.00	100.98	0.001	0.000
Market Cap	123	54,668.42	3,682.95	160,066.00	53	2,041.40	162.77	5,586.80	0.002	0.000

Table 4: Distribution of event type across Amihud's Illiquidity quintiles

This table reports the distribution of Amihud's Illiquidity with issuance type. Firms have been divided into quintiles based on Amihud's illiquidity measure.

Quintiles - Amihud's Illiquidity	1- Least Liquid	2	3	4	5 - Most Liquid
Bonus	3	2	2	2	
IPP				4	7
OFS	18	10	12	18	14
Rights		2			
Secondary Market	1	1	1		
SNIF			2	3	
OFS (2 times)	1		2	1	3
OFS (4 times)					1
OFS + Bonus					1
OFS (4 times) + Bonus					1

Table 5: Stock price reaction around event-level OFS

The table shows the price reaction of sample stocks around the OFS date on an event-by-event basis. Event time is measured as the number of trading days from the issue date. N (in column 2) refers to number of unique issuances. AR stands for abnormal return generated by the market model for a stock i as on day d. CAR is the cumulation of AR from day -5 to day d. Std CS test refers to t-statistics computed following the procedure in Boehmer et al. (1991). T-statistics are adjusted to take into account cross-correlation due to event-date clustering using the methodology described in Kolari and Pynnönen (2010).

		CAR				AR			
Event Time	N	Mean	Median	Adj Std CS test	SR test	Mean	Median	Adj Std CS test	SR test
				Panel A: Non-PSUs					
-5	66	−0.19%	−0.07%	−1.13	−150.50	−0.19%	−0.07%	−1.13	−150.50
-4	66	0.00%	−0.09%	0.34	−47.50	0.19%	0.22%	0.61	114.50
-3	66	0.07%	−0.33%	0.73	−81.50	0.10%	−0.27%	0.69	−171.50
-2	65	0.36%	0.02%	0.14	11.50	0.32%	0.33%	1.38	165.50
-1	67	−0.53%	−1.40%	−0.44	−267.00*	−0.94%	−1.04%	−0.70	−413.00***
0	66	−2.60%	−2.41%	−2.95***	−494.50***	−1.88%	−1.55%	−3.30***	−460.50***
1	66	−3.38%	−3.33%	−3.16***	−511.50***	−1.03%	−1.12%	−1.36	−374.50**
2	66	−3.90%	−2.78%	−3.40***	−607.50***	−0.52%	−0.14%	−0.74	−144.50
3	63	−4.36%	−2.64%	−3.35***	−550.00***	−0.38%	0.01%	−0.34	−74.00
4	65	−4.71%	−3.54%	−3.48***	−617.50***	−0.38%	−0.03%	−0.77	−136.50
5	67	−4.89%	−3.35%	−3.65***	−631.00***	−0.25%	−0.03%	−1.13	−128.00
				Panel B:PSUs					
-5	7	−1.00%	−1.42%	−1.55	−8.00	−1.00%	−1.42%	−1.55	−8.00
-4	7	−0.67%	−0.32%	−0.73	−3.00	0.33%	0.08%	0.61	3.00
-3	7	−1.02%	−0.13%	−0.65	−2.00	−0.35%	−0.50%	−0.32	−4.00
-2	7	−2.43%	−4.39%	−1.17	−6.00	−1.41%	−0.99%	−1.22	−5.00
-1	7	−2.33%	−0.49%	−0.80	−5.00	0.09%	0.61%	0.07	0.00
0	8	−6.24%	−6.68%	−3.75***	−17.00**	−4.19%	−2.71%	−1.46	−10.00
1	7	−12.30%	−8.93%	−2.68**	−14.00**	−5.72%	−3.58%	−1.80	−13.00**
2	7	−14.60%	−10.41%	−2.27*	−11.00*	−2.38%	−2.96%	−1.08	−6.00
3	8	−11.50%	−10.11%	−1.84	−10.00	1.83%	−0.72%	0.33	−3.00
4	8	−11.30%	−13.57%	−1.66	−10.00	0.16%	−1.56%	0.29	−7.00
5	8	−11.00%	−16.64%	−1.53	−10.00	0.37%	−0.23%	0.14	−1.00

Table 6: Stock price reaction around firm-level OFS

The table below shows the price reaction of sample stocks around the OFS date. CAR for multiple events by the same firm has been cumulated. Issuance dates are different for different companies. Event time is measured as the number of trading days from the issue date. N (in column 2) refers to number of unique issuances. AR stands for abnormal return generated by the market model for a stock i as on day d. CAR is the cumulation of AR from day -5 to day d. Std CS test refers to t-statistics computed following the procedure in Boehmer et al. (1991). T-statistics are adjusted to take into account cross-correlation due to event-date clustering using the methodology described in Kolari and Pynnönen (2010).

		CAR				AR			
Event Time	N	Mean	Median	Std CS test	SR test	Mean	Median	Std CS test	SR test
				Panel A: Non-PSUs					
-5	56	−0.20%	−0.07%	−1.04	−96.00	−0.20%	−0.07%	−1.04	−96.00
-4	56	0.05%	0.01%	0.23	−18.00	0.25%	0.29%	0.71	73.00
-3	56	0.16%	−0.15%	0.62	−14.00	0.14%	−0.23%	0.63	−72.00
-2	55	0.52%	0.02%	0.23	29.00	0.39%	0.37%	1.35	130.00
-1	57	−0.53%	−1.46%	−0.39	−199.50	−1.09%	−1.45%	−0.73	−292.50**
0	56	−2.93%	−2.59%	−2.90***	−367.00***	−2.19%	−1.27%	−2.42**	−290.00**
1	56	−3.84%	−3.33%	−3.03***	−379.00***	−1.20%	−1.55%	−1.41	−290.00**
2	56	−4.43%	−3.58%	−3.40***	−451.00***	−0.58%	−0.20%	−0.63	−120.00
3	53	−4.98%	−3.44%	−3.34***	−401.50***	−0.43%	−0.19%	−0.29	−59.50
4	55	−5.35%	−3.98%	−3.55***	−458.00***	−0.42%	−0.03%	−0.63	−114.00
5	57	−5.51%	−4.49%	−3.65***	−471.50***	−0.28%	−0.29%	−0.99	−102.50
				Panel B: PSUs					
-5	6	−1.29%	−1.46%	−1.66	−8.50*	−1.29%	−1.46%	−1.66	−8.50*
-4	6	−0.92%	−0.75%	−0.76	−3.50	0.36%	0.38%	0.61	2.50
-3	6	−1.29%	−0.56%	−0.61	−2.50	−0.37%	−0.38%	−0.20	−5.50
-2	6	−2.99%	−1.85%	−1.20	−4.50	−1.70%	−0.63%	−1.89	−7.50
-1	6	−3.03%	−4.07%	−0.89	−5.50	−0.04%	0.82%	−0.16	1.50
0	7	−7.54%	−7.60%	−4.35***	−14.00**	−4.95%	−4.19%	−1.45	−8.00
1	6	−14.80%	−9.36%	−2.57*	−10.50**	−6.72%	−2.64%	−1.63	−9.50*
2	6	−17.70%	−16.59%	−2.14*	−8.50*	−2.86%	−3.13%	−1.07	−3.50
3	7	−13.80%	−10.87%	−1.93	−8.00	1.95%	−0.46%	0.44	−3.00
4	7	−13.70%	−15.36%	−1.71	−8.00	0.13%	−2.56%	0.38	−6.00
5	7	−13.40%	−21.37%	−1.58	−7.00	0.30%	−0.15%	0.00	−1.00

Table 7: Stock price reaction around OFS after excluding confounding events

The table below shows the reaction of sample stocks around the OFS date. This table excludes those events that had a confounding firm-specific information event around the OFS data. Issuance dates are different for different companies. Event time is measured as the number of trading days from the issue date. N (in column 2) refers to number of unique issuances. AR stands for abnormal return generated by the market model for a stock i as on day d. CAR is the cumulation of AR from day -5 to day d. Std CS test refers to t-statistics computed following the procedure in Boehmer et al. (1991). T-statistics are adjusted to take into account cross-correlation due to event-date clustering using the methodology described in Kolari and Pynnönen (2010).

		CAR				AR			
Event Time	N	Mean	Median	Adj Std CS test	SR test	Mean	Median	Adj Std CS test	SR test
-5	66	−0.43%	−0.32%	−1.88	−290.50	−0.43%	−0.32%	−1.88	−290.50
-4	66	−0.28%	−0.43%	−0.84	−145.50	0.15%	0.06%	0.58	94.50
-3	66	−0.36%	−0.65%	−1.35	−210.50	−0.06%	−0.41%	−0.99	−235.50
-2	65	−0.42%	−0.93%	−0.84	−183.50	−0.03%	0.19%	−0.58	37.50
-1	67	−1.36%	−1.55%	−1.64	−392.00**	−1.00%	−0.99%	−1.17	−411.00***
0	68	−3.54%	−4.06%	−4.57***	−683.00***	−2.20%	−1.55%	−3.44***	−510.00***
1	66	−5.27%	−3.86%	−4.77***	−694.50***	−1.76%	−1.42%	−2.03**	−480.50***
2	66	−5.85%	−3.77%	−4.56***	−732.50***	−0.58%	−0.04%	−0.93	−148.50
3	64	−5.89%	−3.51%	−4.15***	−640.00***	0.10%	−0.21%	0.26	−83.00
4	67	−6.02%	−3.93%	−4.04***	−721.00***	−0.30%	−0.03%	−0.73	−193.00
5	68	−6.43%	−4.40%	−4.20***	−780.00***	−0.43%	−0.23%	−1.55	−223.00

Table 8: Stock price reaction around OFS when stake reduced to exactly 75%

The table below shows the reaction of sample stocks around the OFS data after excluding firms that reduced promoter stake to less than 75% after OFS. Issuance dates are different for different companies. Event time is measured as the number of trading days from the issue date. N (in column 2) refers to number of unique issuances. AR stands for abnormal return generated by the market model for a stock i as on day d. CAR is the cumulation of AR from day -5 to day d. Std CS test refers to t-statistics computed following the procedure in Boehmer et al. (1991). T-statistics are adjusted to take into account cross-correlation due to event-date clustering using the methodology described in Kolari and Pynnönen (2010).

		CAR				AR			
Event Time	N	Mean	Median	Adj Std CS test	SR test	Mean	Median	Adj Std CS test	SR test
-5	55	−0.30%	0.13%	−1.30	−74.00	−0.30%	0.13%	−1.30	−74.00
-4	54	−0.04%	0.01%	−0.41	−11.50	0.27%	0.12%	0.61	82.50
-3	55	0.17%	−0.28%	0.57	−38.00	0.21%	−0.28%	0.41	−131.00
-2	54	0.50%	0.18%	0.27	19.50	0.35%	0.34%	1.35	128.50
-1	55	−0.62%	−1.46%	−0.35	−195.00	−1.14%	−1.06%	−0.68	−323.00***
0	55	−2.63%	−2.44%	−2.52***	−342.00***	−2.00%	−1.30%	−3.01***	−309.00***
1	54	−3.58%	−3.30%	−2.78***	−343.50***	−0.99%	−1.02%	−1.03	−235.50**
2	54	−3.79%	−2.62%	−2.79***	−384.50***	−0.21%	−0.14%	−0.32	−55.50
3	52	−4.16%	−2.75%	−2.79***	−374.00***	−0.26%	0.01%	−0.05	−28.00
4	54	−4.26%	−3.02%	−2.77***	−398.50***	−0.23%	−0.02%	−0.34	−78.50
5	55	−4.52%	−3.35%	−3.01***	−414.00***	−0.25%	0.03%	−0.94	−43.00

Table 9: Determinants of CAR using a Heckman model

The table below shows the results from the Heckman's model that include controls for the self-selection into the group of firms that complied with the MPS norms. In the first stage model, the dependent variable Compliance takes a value of 1 if the firm complies with the MPS norms and 0 if it does not. In the second stage, the dependent variable is either abnormal return on the date of issuance (AR_0) or CAR around issuance date. Assets is the firm's total assets in millions of rupees. Dilution fraction is the ratio of the percentage of promoters shares sold divided by the total percentage of shares held by promoters pre-issuance. PSU dummy is equal to 1 for PSU firms. Index dummy is equal to 1 for firms in the CNX Nifty index. t-statistics are in brackets below each estimate. Industry dummies are based on two-digit National Industrial Classification (NIC) codes. z-statistics are in parentheses below each estimate. * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$.

	(1)	(2)	(3)
First-stage selection model			
Compliance			
Log(Total Assets)	0.450***	0.440***	0.510***
	[6.210]	[6.251]	[6.238]
Intercept	-3.509***	-3.443***	-4.073***
	[-5.965]	[-6.006]	[-6.049]
Second-stage selection model			
	AR	CAR (0, +1)	CAR (0, +2)
PB	-0.004***	-0.005**	-0.014***
	[-3.237]	[-2.573]	[-2.779]
RMSE	-0.008	-0.025	-0.058**
	[-0.653]	[-1.325]	[-2.307]
Dilution Fraction	-0.146	0.138	0.440
	[-1.134]	[0.617]	[1.512]
PSU Dummy	-0.002	-0.011	-0.019
	[-0.064]	[-0.230]	[-0.283]
F&O Dummy	0.053*	0.119**	0.143**
	[1.857]	[2.394]	[2.122]
Inverse Mills Ratio	0.024	0.062	0.113**
	[0.906]	[1.588]	[2.208]
Intercept	0.048	0.107	0.121
	[1.054]	[1.400]	[1.283]
Industry F. E.	YES	YES	YES
Observations	127	126	124

Table 10: Tests for post-OFS returns reversal

This table presents coefficient estimates from the following cross-sectional regression: $CAR_{1-T,j} = \alpha + \beta AR_{0,j} + \varepsilon_{1-T,j}$, where $CAR_{1-T,j}$ is the cumulative abnormal stock return beginning day +1 through day +T both days inclusive, T takes values from 1 to 130, and $AR_{0,j}$ is the abnormal return on day 0, the date of issuance. We present p-values from testing $\beta = 0$ and $\beta = -1$.

Dependent Variable	Intercept	β	$\beta = 0$ p-value	$\beta = -1$ p-value	N	R^2
CAR_{1-1}	−0.011	0.260	0.0430	0.0000	71	5.79%
CAR_{1-2}	−0.019	0.201	0.2430	0.0000	71	1.97%
CAR_{1-3}	−0.015	0.337	0.1090	0.0000	68	3.85%
CAR_{1-4}	−0.018	0.340	0.1700	0.0000	71	2.71%
CAR_{1-5}	−0.019	0.393	0.1430	0.0000	71	3.08%
CAR_{1-10}	−0.024	0.356	0.2910	0.0001	69	1.66%
CAR_{1-15}	−0.024	0.359	0.3430	0.0006	69	1.34%
CAR_{1-20}	−0.029	0.720	0.1100	0.0002	69	3.77%
CAR_{1-25}	−0.020	0.721	0.1610	0.0012	69	2.92%
CAR_{1-30}	−0.025	0.689	0.1830	0.0016	67	2.71%
CAR_{1-35}	−0.028	0.746	0.1860	0.0026	70	2.55%
CAR_{1-40}	−0.027	0.784	0.1820	0.0031	69	2.65%
CAR_{1-45}	−0.026	0.951	0.1290	0.0024	70	3.36%
CAR_{1-50}	−0.021	0.918	0.1650	0.0046	69	2.85%
CAR_{1-55}	−0.014	0.550	0.4550	0.0376	68	0.85%
CAR_{1-60}	−0.003	0.565	0.4520	0.0399	68	0.86%
CAR_{1-65}	0.000	0.657	0.4070	0.0393	66	1.08%
CAR_{1-70}	−0.014	0.570	0.4810	0.0552	67	0.77%
CAR_{1-75}	−0.017	0.344	0.6890	0.1206	67	0.25%
CAR_{1-80}	−0.005	0.588	0.5050	0.0746	66	0.70%
CAR_{1-85}	−0.004	0.502	0.5900	0.1098	67	0.45%
CAR_{1-90}	−0.013	0.284	0.7730	0.1945	63	0.14%
CAR_{1-95}	−0.025	0.346	0.7310	0.1837	65	0.19%
CAR_{1-100}	−0.021	0.311	0.7700	0.2206	63	0.14%
CAR_{1-105}	−0.015	0.349	0.7540	0.2275	63	0.16%
CAR_{1-110}	−0.009	0.403	0.7190	0.2130	65	0.21%
CAR_{1-115}	0.011	0.588	0.6090	0.1696	63	0.43%
CAR_{1-120}	0.003	0.266	0.8210	0.2848	64	0.08%
CAR_{1-125}	0.029	−0.045	0.9580	0.2672	63	0.00%
CAR_{1-130}	0.026	−0.121	0.8900	0.3181	62	0.03%

Table 11: Excess turnover around share issuance

This table reports the excess turnover for around the issuance of stocks. Daily turnover is the natural logarithm of the ratio of daily share volume to shares outstanding. This is calculated daily over the estimation period, which is from day -170 to day -21 before share issuance, with a minimum of 120 non-missing daily turnovers. On each day of the event window from day -5 to day +20, the excess turnover is the difference between the daily turnover and the median of the daily turnover from the estimation period. The mean and median across all events are presented in the table. W-stat is the Wilcoxon signed rank test statistic. The t-stat (W-stat) tests whether the mean (median) excess return is different from zero. * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$.

	Excess Turnover			
Event Time	Mean	Median	t-stat	W-stat
-5	−0.017	0.07	−0.106	19.50
-4	0.087	−0.06	0.587	−13.50
-3	0.148	0.17	0.877	216.50
-2	0.320	0.10	1.715*	350.00**
-1	0.914	0.55	4.815***	805.50***
0	1.773	1.67	8.481***	1172.50***
1	1.224	1.06	4.708***	829.50***
2	0.762	0.61	3.274***	667.50***
3	0.503	0.46	2.557**	434.00**
4	0.523	0.38	2.688***	457.50**
5	0.269	0.26	1.647	304.00
6	0.435	0.19	2.206**	455.50**
7	0.379	0.30	2.319**	391.00**
8	0.231	0.21	1.546	275.50
9	0.180	0.20	0.924	218.00
10	0.187	0.29	0.998	243.50
11	0.117	0.32	0.599	305.50*
12	0.227	0.46	1.176	349.00*
13	0.059	0.12	0.346	97.50
14	0.174	0.15	0.878	231.50
15	−0.001	0.13	−0.006	81.50
16	−0.014	−0.12	−0.086	−28.50
17	−0.202	−0.10	−1.180	−105.50
18	−0.078	−0.02	−0.442	27.50
19	−0.179	−0.18	−1.123	−197.00
20	0.138	0.22	0.771	183.50

Table 12: Stock price reaction around SEBI notification on June 4, 2010

SEBI notified the rule regarding minimum public holding on June 4, 2010. Specifically, Non-PSU (PSU) firms where the public shareholding was less than 25% (10%) were asked to increase the same to at least 25% (10%). The table below shows the reaction of affected stocks in and around notification date. Event time is measured as the number of trading days from June 4, 2010. N (in column 2) refers to number of unique companies. AR stands for abnormal return generated by the market model for a stock i as on day d. CAR is the cumulation of AR from day -5 to day d. Std CS test refers to t-statistics computed following the procedure in Boehmer et al. (1991). T-statistics are adjusted to take into account cross-correlation due to event-date clustering using the methodology described in Kolari and Pynnönen (2010).

		CAR				AR			
Event Time	N	Mean	Median	Adj Std CS test	SR test	Mean	Median	Adj Std CS test	SR test
-5	140	0.29%	0.01%	1.48	450.00	0.29%	0.01%	1.48	450.00
-4	139	1.25%	0.07%	2.70***	896.00*	0.91%	0.11%	2.39**	819.00*
-3	138	1.87%	1.28%	4.02***	1732.50***	0.61%	0.58%	3.04***	1351.50***
-2	139	1.58%	0.90%	3.19***	1171.00**	−0.27%	−0.58%	−1.07	−993.00**
-1	140	1.05%	0.10%	2.14**	572.00	−0.44%	−0.90%	−1.58	−1447.00***
0	138	0.47%	−0.07%	1.01	0.50	−0.58%	−0.81%	−2.72***	−1953.50***
1	140	2.08%	2.09%	4.35***	1773.00***	1.54%	0.71%	5.17***	1972.00***
2	139	2.08%	1.78%	4.22***	1720.00***	−0.04%	−0.03%	−0.28	−187.00
3	138	1.72%	1.98%	3.48***	1399.50***	−0.33%	−0.34%	−1.31	−1075.50**
4	141	1.28%	1.28%	2.72***	1068.50**	−0.47%	−0.77%	−2.17**	−1739.50***
5	138	0.48%	0.62%	1.60	446.50	−0.72%	−0.97%	−3.26***	−1952.50***

Table 13: Stock price reaction around firm announcement of event details

The table below shows the reaction of affected stocks around the announcement date of the issue by promoters. Event time is measured as the number of trading days from the announcement date. N (in column 2) refers to number of unique issuances. AR stands for abnormal return generated by the market model for a stock i as on day d. CAR is the cumulation of AR from day -5 to day d. Std CS test refers to t-statistics computed following the procedure in Boehmer et al. (1991). T-statistics are adjusted to take into account cross-correlation due to event-date clustering using the methodology described in Kolari and Pynnönen (2010).

		CAR				AR			
Event Time	N	Mean	Median	Adj Std CS test	SR test	Mean	Median	Adj Std CS test	SR test
-5	66	0.05%	−0.08%	0.25	−79.50	0.05%	−0.08%	0.25	−79.50
-4	66	−0.38%	−0.14%	−1.00	−175.50	−0.43%	−0.24%	−1.38	−206.50
-3	65	−0.32%	−0.31%	−1.27	−127.50	0.02%	0.10%	0.97	−23.50
-2	65	0.25%	−0.21%	0.28	25.50	0.70%	0.17%	1.28	201.50
-1	64	0.04%	−0.72%	0.59	−91.00	−0.21%	−0.19%	−0.70	−180.00
0	65	−0.12%	−1.05%	−0.44	−81.50	−0.14%	−0.11%	−0.22	−8.50
1	53	−1.08%	−1.37%	−1.19	−199.50*	−1.06%	−1.04%	−0.96	−263.50**

Table 14: Stock price reaction around bonus issue of shares by firms

The table below shows the reaction of affected stocks near the bonus issuance date. Bonus issuance dates are different for different companies. Event time is measured as the number of trading days from the issue date. N (in column 2) refers to number of unique issuances. AR stands for abnormal return generated by the market model for a stock i as on day d. CAR is the cumulation of AR from day -5 to day d. Std CS test refers to t-statistics computed following the procedure in Boehmer et al. (1991). T-statistics are adjusted to take into account cross-correlation due to event-date clustering using the methodology described in Kolari and Pynnönen (2010).

		CAR				AR			
Event Time	N	Mean	Median	Adj Std CS test	SR test	Mean	Median	Adj Std CS test	SR test
-5	9	0.21%	0.20%	0.19	2.50	0.21%	0.20%	0.19	2.50
-4	9	0.78%	0.46%	0.89	5.50	0.57%	0.61%	1.59	9.50
-3	9	0.91%	0.29%	0.89	2.50	0.13%	0.19%	0.01	3.50
-2	9	1.05%	1.13%	0.65	6.50	0.14%	0.83%	0.04	2.50
-1	9	−0.09%	1.84%	0.00	2.50	−1.14%	−1.40%	−1.12	−11.50
0	9	14.70%	8.07%	1.79	15.50*	14.70%	8.27%	1.85*	19.50**
1	9	11.10%	5.63%	1.40	14.50*	−3.58%	−1.94%	−1.56	−14.50*
2	9	9.70%	6.49%	1.34	11.50	−1.37%	0.06%	−1.09	−5.50
3	9	9.01%	4.56%	1.36	10.50	−0.69%	−0.26%	−0.56	−6.50
4	9	7.21%	4.97%	1.15	6.50	−1.80%	−1.25%	−1.66	−14.50*
5	9	6.63%	3.14%	1.15	7.50	−0.59%	0.23%	−0.10	−2.50

Table 15: Stock price reaction around ipp

The table below shows the reaction of affected stocks near Insitutional Private Placement (IPP). IPP dates are different for different companies. Event time is measured as the number of trading days from the issue date. N (in column 2) refers to number of unique issuances. AR stands for abnormal return generated by the market model for a stock i as on day d. CAR is the cumulation of AR from day -5 to day d. Std CS test refers to t-statistics computed following the procedure in Boehmer et al. (1991). T-statistics are adjusted to take into account cross-correlation due to event-date clustering using the methodology described in Kolari and Pynnönen (2010).

		CAR				AR			
Event Time	N	Mean	Median	Adj Std CS test	SR test	Mean	Median	Adj Std CS test	SR test
-5	13	−0.25%	−0.34%	−0.42	−9.50	−0.25%	−0.34%	−0.42	−9.50
-4	13	−0.66%	−1.51%	−0.95	−9.50	−0.41%	−0.59%	−1.48	−18.50
-3	13	−0.92%	−1.27%	−1.03	−16.50	−0.27%	−0.41%	−0.09	−10.50
-2	13	−0.31%	−0.08%	−0.20	−8.50	0.62%	0.55%	1.17	16.50
-1	13	−0.38%	−0.09%	−0.12	−4.50	−0.08%	−0.23%	−0.08	−1.50
0	13	0.22%	−0.33%	0.28	0.50	0.60%	1.02%	1.16	14.50
1	13	0.93%	−0.41%	0.67	−1.50	0.71%	−0.39%	0.81	2.50
2	13	0.41%	−0.71%	0.38	−6.50	−0.52%	−0.38%	−1.17	−13.50
3	13	0.52%	−1.05%	0.33	−3.50	0.12%	0.14%	0.17	4.50
4	13	0.19%	−1.02%	0.17	−6.50	−0.33%	0.02%	−1.01	−6.50
5	13	−0.18%	−0.98%	−0.03	−9.50	−0.37%	−0.27%	−0.73	−10.50