Corporate Cash Holdings in an Emerging Market: The Case of India

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Abstract

This thesis contributes to the literature on corporate cash holdings. The aim of the thesis is to shed light on the precautionary and agency motives of Indian firms' cash holdings in their transition to integrating with the world economy. Three elements of India's capital market transitioning phase are empirically investigated with respect to firms' cash holdings and related financial policies.

The first chapter of the thesis is concerned with the increasing presence of foreign institutional investors in Indian capital markets. It investigates whether and how foreign institutional ownership restricts the ability of corporate insiders to derive private benefits from firms' cash holdings. This work contributes to the literature which studies corporate governance advancements in emerging markets.

The second chapter of the thesis examines Indian firms' sources of funds conducive to cash holdings. It investigates to what extent firms issue outside finance in order to save proceeds as cash. This work contributes to the literature which studies firms' liquidity management under uncertain financing conditions.

The final chapter of the thesis examines India's capital market institutions. It investigates whether and how deepening domestic capital markets can relieve firm-level financial constraints. This work contributes to the literature which studies firm investment and growth in the context of developing market institutions.

Collectively, these chapters examine the evolution of firm-level outcomes, including cash holdings, investment and firm values in the context of an emerging economy undergoing significant changes in its institutional architecture.

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List of Abbreviations

BSE	Bombay Stock Exchange
CMIE	Center for Monitoring the Indian Economy
DIIs	Domestic institutional shareholders
FIIs	Foreign institutional shareholders
GDP	Gross domestic product
INR	Indian Rupees
NPV	Net present value
NSE	National Stock Exchange
R&D	Research and development
SEBI	Securities and Exchange Board of India
U.K	United Kingdom
U.S	United States

Introduction

Financial and legal institutions in emerging markets have undergone substantial changes over the past two decades. Since the liberalization of their economies, domestic capital markets have embarked on greater integration with the world economy and elements of this integration have been incorporated in financial policies at the firm level. This thesis empirically examines how the evolving nature of financial markets and institutions in a representative emerging market, India, has interacted with corporate liquidity policies of domestic firms. In particular, the thesis studies whether and how firms adjust their cash holdings and related financial policies in response to: i) changes in firms' ownership due to the presence of foreign institutional investors; ii) external market conditions favourable to raising new capital; and iii) deepening domestic capital markets.

The starting point in our discussion is that in a world of perfect capital markets, firms should raise external finance at a fair cost when needed (e.g. Modigliani and Miller, 1958). However, survey-based evidence reveals that managers around the world face frictions in their ability to finance firms' investment projects (e.g. Graham and Harvey, 2001). Capital and financial market frictions are likely more acute in emerging and developing countries. This is because they can be exacerbated by low levels of investor protection (e.g. La Porta et al., 1997; 1998), imperfectly developed financial systems (e.g. Rajan and Zingales, 1998) and weak forms of firm-level corporate governance (e.g. Shleifer and Vishny, 1997). As a result, emerging market companies are likely to face a large wedge between the cost of external and internal capital. This wedge can make firm investment and growth more sensitive to internally-generated funds (e.g. Fazzari et al., 1988). Alternatively, it can induce the firm to hold a large fraction of assets in the form of cash and other liquid assets (e.g. Opler et al., 1999).

There is now a vast literature exploring determinants and consequences of firms' cash holdings (See Amess et al. (2015) for a literature review). This literature can broadly be classified into two groups. The first group builds on theories going back to Keynes (1936) which highlight the precautionary motive in holding cash. That is, firms hold cash to support operations and investments in case outside funding becomes more difficult to find or prohibitively costly. From this perspective, holding cash creates value to the firm because it allows the manager to invest in positive net present value (NPV) projects that would otherwise have been left unfunded.

The second group emphasizes agency problems in cash holdings. These draw on the separation between firm ownership and control (e.g. Jensen and Meckling, 1976). In emerging and developing countries, however, the main agency problem is the potential for the controlling shareholder/manager to exploit corporate resources at the expense of outside (minority) shareholders. Among corporate assets, cash is particularly at risk of expropriation as insiders can turn liquid assets into private benefits at a lower cost than other corporate assets (e.g. Myers and Rajan, 1998).

The main implication from this research is that investing in liquid assets can be a double-edged sword for the firm. On the one hand, it can shield the growth of firms' more productive assets against capital market imperfections and market failures (e.g. crisis episodes). This can happen because the firm can adjust its cash holdings at a lower cost than capital expenditures and R&D investments (e.g. Brown and Petersen, 2011). On the other hand, holding cash reduces the need to raise new capital and alleviates the market's watchdog role in monitoring firm management. This increases the manager's discretionary power over levels and uses of idle cash.

Given advanced financial, institutional and hedging markets in the United States (U.S.) and other developed economies, it is a puzzle why non-financial firms hold substantial amounts of cash in their balance sheets and why liquid asset holdings are secularly increasing (e.g. Bates et al., 2009). By contrast, the established view in the emerging and developing world is that domestic firms hold cash pertinent to their weak governance structures and low investor protection.

This rather restrictive view of cash holdings in emerging markets is the main motivation for this research work. In particular, it identifies and builds on two types of limitations. First, prior research draws inferences on firms' cash holdings in a static setting, mainly from comparative analyses between emerging market firms and firms in more advanced economies. Hence, it overlooks the recent experience of financial market liberalizations and economic reforms which emerging market companies have been exposed to. Given previously weak financial and legal systems, these developments are likely to have had pronounced implications on firms' management decisions.

Second, research on cash holdings has overlooked the interplay between precautionary and agency perspectives in cash holding. For example, improvements in firm-level corporate governance can restrict insiders' ability or incentives to accumulate large cash holdings. On the other hand, in the absence of alternative hedging financial instruments, reduced financial resources may expose the firm to adverse market conditions, such as in a period of financial crisis. This trade-off is likely weakened when the firm has access to advanced financial and hedging institutions, which makes extrapolation of U.S. evidence on cash holdings of emerging market companies insufficient and possibly misleading.

This thesis provides a systematic analysis of firms' cash holdings in a representative emerging market to overcome this problem. Given the increasing interest of researchers, policy makers and the media about large cash holdings of non-financial companies worldwide (e.g. Bates et al., 2009), it is important to understand better cash holdings and related firm decisions such as investment and financing in emerging markets.

We conduct our empirical analysis using data from a representative emerging market, India. India offers an ideal laboratory to explore implications of economic market reforms on corporate cash holdings and related financial policies. In the aftermath of a severe balance of payments crisis in the early 1990s, India embarked on a number of key reforms to rejuvenate its economy and improve its competitiveness in the global markets. This work examines three elements of India's transitioning phase to becoming an open economy as they relate to firms' liquidity policies.

First, there was a surge in capital inflows from foreign portfolio investors, following the lifting of restrictions on foreign ownership of corporate assets. For the most part, this had implications on the composition of firms' ownership. Once shying away from investing in Indian markets, foreign institutional investors, such as pension funds and hedge funds, actively participated in India's primary and secondary markets. These developments likely have had implications on firm-level corporate governance standards. As international investors increased their investment positions in domestic firms, they were better positioned to challenge firm management to assure themselves that capital will not be wasted by corporate insiders in inefficient uses.

Second, there was a series of economic reforms set to improve firm-level corporate governance. These required, among others, a minimum presence of independent members on the board of directors to strengthen monitoring on firm management. The reforms serve as a plausibly exogenous source of variation in firm-level corporate governance and developments in firms' cash holdings.

Finally, government incentives to improve the country's capital market institutions laid the foundations for the creation of a new stock exchange, the National Stock Exchange (NSE). The new market emerged as the country's first stock exchange to adopt technological advances in trading -- at par with those of advanced economies -- which aimed to promote transparency in price formation and overcome geographical limits in trading. As a result, investors from across the country would benefit from greater diversification options and lower transaction costs in trading and domestic firms would benefit from a larger and deeper capital market.

In this context, the thesis is structured as follows. The first chapter considers developments in firm-level corporate governance due to the increasing ownership held by foreign institutional investors. This chapter asks whether and how foreign institutional ownership restricts the ability of controlling shareholders to turn firms' cash holdings into private benefits? By examining levels, values and uses of firms' cash holdings, it highlights changes in firms' governance environment as they integrate with the world economy. This work builds on prior research by drawing attention to cash holdings as a specific mechanism through which institutional activism may materialize in emerging market companies.

The second chapter focuses on sources of funds conducive to cash holdings. It examines infusions of capital in the form of equity and debt. It asks which types of securities induce savings in the form of precautionary cash holdings and examines the implications of the issuance-saving link on firm investment. This work adds to the literature by presenting precautionary-saving motives as an integral part of external financing decisions of firms facing uncertain financing conditions.

Finally, the third chapter examines firm-level implications of deepening domestic capital markets. It explores the unique setting of firms already listed on a stock exchange cross-listing shares on a competitive trading platform of a new domestic stock exchange. The new market offered advanced information technology to market participants to overcome capital market frictions in previously segmented markets. This chapter asks whether and how greater equity market integration can relieve firm-level financial constraints? It provides a unique environment in which to empirically test competing cross-listing theories debated in the literature, as they relate to firms' access to capital.

Collectively, these chapters examine the evolution of firm-level outcomes, including cash holdings, firm's access to capital, and allocation of capital in the context of an emerging market undergoing significant changes in its institutional architecture. As such, this thesis can be used as a reference for firm-level analysis in other emerging and developing economies integrating with the world economy.

~ CHAPTER ONE ~

Institutional investors as foreign shareholders in emerging market companies: Evidence from India

Abstract

This chapter empirically investigates whether and how foreign institutional investors curb agency problems related to cash holdings of emerging market companies. Using firm-level data from India, we find a negative relation between foreign institutional ownership and cash holdings. This relation is suggestive of increased external monitoring as it: i) was more pronounced in firms with weaker forms of internal governance; ii) was associated with higher firm values; and, iii) did not expand to ownership held by 'passive' domestic institutional investors. This type of monitoring was exerted through the influence on the board for higher payouts of cash. Overall, this chapter suggests that foreign institutional ownership may be a key mechanism to improving firm-level corporate governance in emerging markets, and firms' cash holdings are a particular channel through which this may work.

1.1 Introduction

Institutional investors, such as hedge funds and pension funds, are the dominant ownership group in U.S. stock markets. Previous studies suggest that they are a critical mechanism for disciplining firm management and for promoting shareholder-friendly financial policies (e.g. Aghion et al., 2013). Following financial liberalizations in the emerging and developing world, institutional investors have become important players in international financial markets too (e.g. Gillan and Starks, 2003). However, there is still little knowledge about their role as foreign shareholders. In particular, there is limited evidence to suggest whether and by which mechanisms foreign institutional investors may monitor firms in the emerging and developing world. Answering this question is important from two perspectives. On the one hand, domestic firms look for ways to attract foreign investors to overcome investment barriers and capital market frictions at home. On the other hand, institutional investors rely on firm-level corporate governance to form their investment portfolios (e.g. McCahery et al., 2016).

This chapter fills that gap in the literature by studying whether and how foreign institutional investors curb the ability or incentives of corporate insiders to convert firms' cash holdings into private benefits. The motivation for studying cash holdings is based on prior research which shows that corporate insiders can turn liquid assets into private benefits at a lower cost than other assets (e.g. Myers and Rajan, 1998). For example, insiders may tunnel cash to other connected companies (e.g. Bertrand et al., 2002), spend cash on wasteful acquisitions (e.g. Harford, 1999) or receive excessive salaries and perks (e.g. Jensen and Murphy, 1990). In such environments, monitoring by institutional investors can reduce agency problems in cash holding, so that capital is not wasted by insiders in inefficient uses.

This concern is particularly important to shareholders of cash-rich firms in countries with imperfectly developed financial and institutional markets. For example, Dittmar et al. (2003) show that firms in low investor protection countries hold on average twice as much cash as their counterparts in high investor protection economies. Related evidence also shows that investors assign lower values to cash held by firms with weaker forms of internal governance (e.g. Kalcheva and Lins, 2007).

As emerging market companies integrate with the world economy, increasing ownership held by foreign institutional investors (henceforth 'FIIs') can bring about significant changes to firm-level corporate governance. Specifically, investment by FIIs creates financial incentives for them to draw on their advanced skills in monitoring and exert effective governance on firm management. This may include monitoring the levels and uses of firms' liquid asset holdings, which prior literature has associated with potentially severe agency problems in weakly-governed firms. Through this type of monitoring, FIIs can influence managers in cash-rich firms to reduce their (excess) cash holdings. This argument gives rise to a negative relation between the fraction of firm's ownership held by FIIs and levels of cash held by the firm.

However, a negative relation to cash holdings may be consistent with alternative explanations. For example, institutional investors which face costly monitoring may influence firms to increase payouts as a means to increasing their returns on investment. Consistent with this view, Gaspar et al. (2013) show that increased payouts in the form of repurchases are associated with institutional investors with short-term investment horizons, i.e. investors less likely to engage with costly monitoring. From another perspective, a negative relation to cash holdings may arise endogenously as a result of institutions targeting firms less likely to hold cash. For example, evidence by Grinstein and Michaely (2005) shows that institutional investors in the U.S. may not affect firms' cash payouts, but instead be attracted to dividend-paying firms.

One way to assess whether changes in cash holdings induced by FIIs relates to changes in firm's governance environment is to track down changes in the value of cash before and after foreign institutional ownership. Prior research suggests that the value investors attach to firm's cash holdings reflects the risk that corporate insiders may consume private benefits embedded in cash holdings (e.g. Pinkowitz et al., 2006). Hence, if foreign institutional ownership induces investors to update their assessment about that risk, changes in cash holdings should be valued more in the presence of FIIs. By contrast, in the absence of changes in firms' governance environment, we should not expect significant differences in how investors value developments in firms' cash holdings, keeping firm fundamentals constant. Consistent with this view, Fresard and Salva (2010) show that cash is valued more in firms cross-listing on more advanced capital markets. They attribute this result to the higher monitoring intensity which accompanies the cross-listing decision. Therefore, cash holdings may represent a promising setting to assess institutional activism in emerging markets and through which to quantify its implications on the value of the firm.

To test the above arguments, we examine institutional investment of Indian public firms during the period 2001-10. India provides an interesting experimental setting to explore empirically these ideas. While institutional shareholders were active monitors of corporate activity in the U.S. since the early 1900s (e.g. Gillan and Starks, 2007), they are a relatively recent phenomenon in India. Following the liberalization of the Indian economy in the early 1990s, foreign investors were permitted to invest in primary and secondary markets of India. These investments increased substantially after the lifting of restrictions on foreign ownership of corporate assets in 2001 (See Figure 1.1). Importantly, FIIs leapfrogged their domestic counterparts to become the largest non-controlling shareholder in Indian public firms by the middle 2000s (See Figure 1.2).

These developments suggest that FIIs may have overcome private costs in monitoring to exert effective governance on firm management. The need to monitor was likely exacerbated by the low level of development of financial and legal institutions before the entry of FIIs and the imperfect monitoring by domestic institutional investors.

Evidence from a sample of 1,500 Indian public firms in the manufacturing industry shows that foreign institutional ownership associated negatively with firms' cash holdings. Specifically, a 10 percentage point increase in foreign institutional ownership was associated with a 3% reduction in the mean cash-to-assets ratio in our baseline specification. The negative relation to cash holdings appears robust to different measures of institutional ownership, after controlling for a set of firm-level financial characteristics associated in the literature with corporate demand for cash (e.g. Bates et al., 2009).

In support of monitoring interpretations, the presence of FIIs was associated with higher values of cash. Specifically, shifts in cash holdings would create a value difference of 0.80 INR for each INR of cash in the presence of FIIs. This evidence suggests that foreign institutional ownership was associated with significantly lower risk in expected private benefit extraction. By contrast, there is no similar relation to domestic institutional investors. The latter are described in India as imperfect monitors of corporate activity and therefore as less likely to challenge firm management over its cash holding policies (e.g. Khanna and Palepu, 1999). These findings suggest that foreign institutional ownership may be a key mechanism to reducing private rents embedded in firms' cash holdings accruing to corporate insiders.

In addition, we explore possible channels through which institutional governance on cash holdings may have worked. Evidence shows that FIIs were likely to influence investee firms to reduce cash holdings by increasing cash payouts. This was facilitated through the influence on the board to authorize the payment of additional dividends within the year. In support of monitoring explanations, this influence was more pronounced in cash-rich firms with low growth opportunities and low external finance needs, i.e. firms in which managers are more likely to exploit firms' cash reserves for own benefit. On the other hand, foreign institutional ownership was associated negatively with firms' spending on low-return investment projects and the salary-pay ratio of firms' top executives. This evidence combined suggests that governance by foreign institutional investors may contribute to reducing private benefits accruing to firm management from inefficient investments and/or higher cash compensations.

We perform a number of robustness tests to check the validity of our results. First, we implement a treatment effects model that controls for a potential selection bias in foreign institutional ownership. Second, we adopt an instrumental-variables approach to address concerns that foreign institutional ownership and cash holdings may be jointly determined by common unobserved factors. In addition, we examine the evolution of firms' cash holdings around foreign institutional investment to test more explicitly reverse causality. Importantly, we also perform tests to isolate the influence of FIIs on cash holdings from exogenously-derived improvements in governance, due to the passage of reforms on firm-level corporate governance.

As a final test, we examine heterogeneity within the institutional investors' group. In particular, we focus on differences between FIIs and domestic institutional investors (henceforth 'DIIs') in their relation to cash holdings. Evidence shows that FIIs were likely to exert effective governance on cash holdings once they held dominant institutional ownership positions in the firm (i.e. $FIIs > DIIs$). An explanation for this result is that relatively higher ownership positions would allow FIIs to overcome private costs in monitoring, including coordination problems with more ‘passive’ DIIs, and thereby receive higher net benefits in monitoring.

In sum, results propose that by focusing on the fundamental problem of holding cash, FIIs were likely to: i) reduce agency problems associated with firms’ cash reserves; and, ii) effectively monitor cash-related financial policies such as firm payouts, investments and executive compensation policies. Therefore, the main implication of our findings is that foreign institutional ownership may be a key mechanism to improving firm-level corporate governance in emerging market companies and cash holdings in particular may be a channel that this works.

Overall, this chapter makes contributions to the literature from three main perspectives. First, it expands the literature on institutional activism by proposing that foreign institutions in emerging markets can take an active interest in reducing agency problems associated with firms’ cash reserves. Prior research has suggested that foreign institutional shareholders play an important role in shaping firm-level corporate governance (e.g. Gillan and Starks, 2003). However, their implications on firm financial decisions as well as the mechanisms that this works remain empirically underexplored. This chapter suggests that cash holdings and related financial decisions are of relevance to external monitoring in emerging markets.

Secondly, it builds on the research on determinants and values of cash holdings (e.g. Opler et al., 1999). Our results suggest that foreign institutional ownership was an important determinant of the amounts of cash held by emerging market firms. In addition, cash was related to a valuation premium in foreign-invested firms. This premium can be interpreted in the context of studies which link greater external monitoring of cash holdings to higher firm values (e.g. Fresard and Salva, 2010). Hence, a value premium in holding cash can be attained if better governance can be ‘imported’ in emerging markets (e.g. by improving market conditions for international investors).

A further implication of our findings is that firms' cash holdings are likely to converge internationally, as FIIs expand their investment portfolios to include companies from across the world. On the one hand, this can help bridge the large differences in cash holdings among firms in different countries, and, to an extent, reduce the gap in underlying agency problems (e.g. Dittmar et al., 2003). On the other hand, it can weaken firms' financial resources which can make firms susceptible to external finance shocks, such as in a period of financial crisis.

The remaining chapter is structured as follows. Section 1.2 summarizes the literature on corporate cash holdings and provides an overview of corporate governance in India. Section 1.3 presents the data. Section 1.4 provides the main findings on the relation between institutional ownership and cash holdings. Section 1.5 presents results from robustness tests on this relation. Section 1.6 explores sources and implications of foreign institutional ownership. Section 1.7 explores heterogeneity within the institutions' group. Finally, Section 1.8 concludes.

1.2 Related literature

This work brings together two streams of research, namely studies on corporate cash holdings and studies on institutional investments. This section presents the theoretical background of the chapter. It starts by summarizing the main conclusions from the research on agency problems in cash holding and its implications on emerging market firms. It then discusses implications at the firm-level which arise from foreign institutional shareholders. Finally, the focus shifts to the country of reference by briefly presenting the governance framework of Indian public firms and how it might have been affected by the presence of institutional investors.

1.2.1 The agency problem in holding cash

The starting point in our discussion is that agency problems in holding cash, and consequently monitoring by shareholders, are important determinants of the amount of cash held by the firm and its contribution to firm values.[1] This argument is based on agency theories which posit that in the absence of sufficient external sources of governance (e.g. low investor protection at the country level) or internal (e.g. inefficient boards at the firm level), managers are likely to exploit corporate resources at the expense of shareholders (e.g. La Porta et al., 2002).

Among corporate assets, cash is a strong candidate for being turned into private benefit. This is because cash can be expropriated at a lower cost than other assets and much of its use is at manager's discretion. For example, managers can tunnel cash to other connected firms (e.g. Bertrand et al., 2002), spend it on wasteful acquisitions (e.g. Harford, 1999) or derive excessive salaries and perks (e.g. Jensen and Murphy, 1990). Myers and Rajan (1998) picture this colourfully by arguing that it is easier for corporate insiders to make cash disappear than make a plant disappear.

Agency problems in cash holding are likely more acute in the emerging and developing world. This is because stock markets may not perform their inherent monitoring role described in Holmstrom and Tirole (1993), and investor protection can be further attenuated at the firm level by weak forms of internal governance. In such environments, controlling shareholders are likely to hoard cash with few concerns that they may be challenged by minority shareholders. In turn, the latter are likely to discount the value of cash considering that, to an extent, it will be used by insiders to serve their private objectives.

On the empirical ground, Dittmar et al. (2003) document that corporations in low investor protection countries hold on average twice as much cash as corporations in countries with good investor protection. Subsequent work by Pinkowitz et al. (2006) associates cash in low investor protection countries with lower firm values. In a similar vein, Kalcheva and Lins (2007) show that the markdown in the value of cash is more severe in firms with higher expected managerial agency problems. Overall, the literature posits that it is only when the firm subjects itself to stronger forms of governance -- for example by cross-listing

[1] See Almeida et al. (2014) for a literature review on corporate liquidity management, and Amess et al. (2015) for a review on corporate cash holdings in particular.

on more advanced capital markets (e.g. Fresard and Salva, 2010) -- that investors update their assessment about the risk that insiders may turn cash holdings into private benefits.

This chapter expands the literature on cash holdings by proposing and testing the hypothesis that monitoring by foreign institutional investors may shrink the private benefits associated with firms' cash holdings, with positive implications on the value of the firm. We draw our motivation from the literature which studies the role of institutional investors in monitoring firm management. Although the literature has long established that institutional shareholders may act as watchdogs of good governance practices in U.S. firms, their role in promoting shareholder-friendly financial policies in the rest of the world has been relatively underexplored.

For example, Gillan and Starks (2003) discuss the potential monitoring role of fund managers as they expand their investment portfolios to include firms from across the globe. Subsequent work by Ferreira and Matos (2008) presents evidence that foreign institutional ownership is associated with higher firm values and better operating performance. More recent developments in the literature suggest that institutions drive improvements in corporate governance around the world (e.g. Aggarwal et al., 2011; Bena et al., 2015).

However, less work is devoted to the possible channels of institutional governance. Survey-based evidence shows that fund managers consider agency conflicts with corporate insiders important to the investment decision and the majority would engage in some form of shareholder activism (e.g. McCahery et al., 2016). Building on this evidence, Firth et al. (2016) show that mutual funds in China influence firms to pay higher dividends as a means to reducing free cash-flow problems. They attribute this result to the implicit threat of selling their shares (threat of 'exit').

By contrast, this chapter focuses on the fundamental problem of holding cash in weakly-governed environments. It studies whether and how foreign institutional investors contain cash-related agency problems. There are at least two reasons that this may hold. First, cash holdings represent a substantial fraction of firms' total assets in emerging markets.[2] Hence,

[2] Dittmar et al. (2003) compare cash holdings of firms worldwide and show that they may amount to well over 20% of firms' total assets, albeit with large discrepancies across countries.

the value created by disciplining their use may be large enough to compensate for the private costs in monitoring. This argument follows theories that incentives to intervene increase with the expected increase in the value of shareholdings (e.g. Shleifer and Vishny, 1986). In our context, this may materialize if a less liquid balance sheet increases net benefits in monitoring for institutional shareholders. This can happen because holding lower cash balances reduces the potential to derive private benefits from cash holdings, and entails that more funds can be paid out to shareholders or invested in value-enhancing projects.

Second, cash holdings may be well-suited to examine monitoring implications because of the upside potential they can produce in terms of cash returns to investors. The literature suggests that institutional investors look for ways to mitigate agency and information asymmetry problems which put returns on their invested capital at risk (e.g. McCahery et al., 2016). Large cash holdings can potentially be translated into higher payouts. Therefore, by targeting firms with large cash holdings, institutional investors can increase returns on investment and mitigate the impact of cash-related agency problems, other things equal.

However, not all institutional investors bear the same costs or share the same incentives in monitoring. A substantial amount of research suggests that domestic institutional investors (DIIs) may be less inclined to challenge firm management than their foreign counterparts (e.g. Chen et al., 2007; Ferreira and Matos, 2008). A number of different reasons have been proposed in the literature. These include closer business ties to domestic firms, superior information about firm fundamentals, and low monitoring exposure. Therefore, DIIs may be differently inclined from FIIs to engage with costly monitoring of firms' cash holdings.

Under these conditions, there might be a discrepancy in the cash holdings between foreign and domestic institutional investors. That is, foreign institutional ownership should be negatively related to cash holdings consistent with monitoring explanations. On the other hand, holdings by domestic institutions should not be significantly related to cash holdings if they are not expected to exert monitoring on firm management or they might be positively related if their imperfect monitoring allows managers to hoard cash.

Before presenting the data used for testing the aforementioned arguments, we briefly describe the corporate governance landscape in India and discuss how it might have been affected by the entrance of foreign institutional investors in the Indian setting.

1.2.2 Institutional investors in Indian financial markets

India scores relatively high in the *de jure* investor protection index of La Porta et al. (1998). However, when it comes to *de facto* investor protection, research suggests that corporate insiders in Indian firms may expropriate the wealth of minority (outside) shareholders. For example, Bertrand et al. (2002) show that expropriation can take place by transferring cash to projects outside the firm. In such environments, dispersed shareholders have few means to assure themselves that cash will not be misused or expropriated by controlling shareholders. This is exacerbated by poor monitoring performance by minority blockholders such as DIIs. For example, Khanna and Palepu (1999) argue that DIIs in India, which are typically government-controlled banks and financial institutions, are less likely to vote against firm's management decisions or challenge its management practices.

The entrance of FIIs in Indian capital markets is likely to have transformed the country's corporate governance landscape. Since the liberalization of the economy in the early 1990s, institutional investors such as pension funds, mutual funds and investment trusts, were allowed to register with the country's governance body (the Securities and Exchange Board of India - SEBI) and invest in the primary and secondary markets.[3] By the middle 2000s, FIIs had overtaken their domestic peers to become the largest non-controlling shareholder group in Indian public firms (See Figure 1.2). In this context, FIIs were likely to capitalize on their increased investment positions and advanced monitoring skills to improve firm-

[3] While there are no monetary limits to equity investments, FIIs were allowed to invest up to 24% of the firm's paid up capital as a group through the stock exchanges in India. In early 2000, this was raised to 40% and since early 2001 it has climbed up to 49% (10% individually), under the approval of the board and the general body of the company. Concerns about whether firms may have endogenously chosen their level of foreign institutional ownership are largely assuaged. First, public firms in India have typically concentrated ownership positions. Hence, ownership by FIIs is expected to stay well below the statutory limit on average. Second, we searched the minutes of board meetings through a special module provided by our datasource (Prowess). We found only a small handful of firms reported to authorize such decisions. Finally, we searched the website of the Reserve Bank of India for corporate events of voluntary change in the statutory limit of foreign institutional ownership. After excluding 44 firms matched with our sample, our results and inferences remain qualitatively unchanged.

level corporate governance. This was particularly so, as the prior institutional environment in India was imperfectly developed and the gap in monitoring capabilities with their domestic peers may have been substantial. In the analysis below, we examine whether these developments had implications on firms' cash holdings and on the value of the firm. Next, we present the data used in the analysis.

1.3 Data

The data for our research are obtained from the *Prowess* database, compiled by the Center for monitoring the Indian Economy (CMIE). Prowess is the primary source of data used by most prior firm-level research on India (e.g. Khanna and Palepu, 2000; Gopalan et al., 2007). We collect data for the period 2001-2008, since information on ownership held by FIIs and DIIs at the individual firm-level is sparse before that period.[4]

Sample firms are firms in the private sector that belong to the manufacturing sectors and have publicly-listed shares in the country's largest stock exchange (Bombay Stock Exchange - BSE). Out of all manufacturing firms covered by Prowess, we exclude government firms and firms in which controlling shareholders ('promoters') are foreign-denominated entities. Hence, foreign institutional investors are foreign shareholders with non-controlling ownership positions in domestic firms. We also exclude firms with missing values on cash holdings which is the main variable of interest. In total, our sample consists of a pool of more than 1,850 firms which span almost 10,000 firm-year observations during the period 2001-2008.

Table 1.1 describes the data. Panel A presents summary statistics for the main variables used in multivariate tests for explaining firms' cash holdings. The average firm in our sample keeps 4.3% of its assets in the form of cash and cash equivalents. This figure is comparable to the cross-country evidence reported by Dittmar et al. (2003) for Indian firms, although our sample size is considerably larger. Combined with net working capital (net of cash), firms in our sample hold almost a quarter of total assets in the form of liquid assets.

[4] Note that in India, the fiscal period starts on April 1st. Therefore, our data cover the fiscal years 2001/2-2008/9.

Turning to ownership variables, total institutional ownership corresponds to almost 10% of the investable shares of the average firm. Within this group, 35% of shares are held by foreign institutions while the rest by domestic institutions. It should be noted that institutional ownership exhibits substantial variation in foreign-invested firms during the period of study, with FIIs becoming the dominant institutional ownership group over time (See Figure 1.2). This variation allows us time-series variation to examine their incremental influence on firm-level corporate governance.

Finally, Panel B examines differences in main variables of interest between foreign-invested firms (i.e. firms targeted by FIIs during the period of study) and the rest of the firms. Evidence from the univariate analysis shows that foreign-invested firms were holding significantly lower levels of cash as a fraction of assets. This implies a negative correlation between cash holdings and foreign institutional ownership which provides some early support to our hypotheses stated above. In the section below, we present and discuss results from multivariate tests in which we control for a set of financial variables associated with corporate demand for cash.

1.4 Empirical findings

1.4.1 Institutional ownership and levels of cash

We start this section by exploring the relation between levels of cash held by the firm and ownership held by institutional investors. Specifically, we explain cash holdings as a function of institutional ownership, after controlling for firm-level factors proposed in the literature as important determinants of the demand for cash (e.g. Opler et al., 1999; Bates et al., 2009). The basic regression specification is as follows:

$$Cash_{it} = \beta_1 FIIs_{it-1} + \beta_2 DIIs_{it-1} + \gamma X_{it-1} + \alpha_i + \theta_t + \varepsilon_{it} \qquad (1.1)$$

In the model, *Cash* is the cash holdings of firm *i* in year *t* scaled by firms' assets. *FIIs* and *DIIs* are the aggregate ownership positions held by foreign and domestic institutional investors in firm *i*, respectively. They appear with lagged values to mitigate problems of simultaneity bias with the dependent variable.[5] X is a vector of variables proposed in the literature as important determinants of holding cash. It includes firms' assets (net of cash), market-to-book ratios, capital expenditures, leverage, net working capital, research (R&D) expenditures, cash-flow volatility and dividend payouts.[6] It also includes firms' sources of cash, i.e. operating cash flows, net issue proceeds and net debt proceeds. In addition, the model includes firm fixed-effects (α_i) and year dummies (θ_t) to account for unobserved differences across firms which are constant over time and common time trends, respectively. Results of these tests are presented in Table 1.2.

In column (1), foreign institutional ownership enters with a negative and statistically significant coefficient (at 5% levels). Figures reported suggest that an increase by 10 percentage points in foreign institutional ownership was associated with lower cash as a fraction of assets by 0.13 percentage points. To put that number into perspective, this represents a decline by 3% (=0.0013/0.043) of the mean cash-to-assets ratio or 5% (=0.0013/0.026) of the respective median. Since we control for a full set of variables proposed by the literature as important determinants of firms' amounts of cash, we can interpret this finding as suggestive of the incremental influence of FIIs on cash holdings after accounting for cash needed for firm's operations and investments.

In contrast, domestic institutional ownership gives rise to a positive, albeit not statistically significant, relation to cash holdings. This evidence is consistent with the work of Khanna and Palepu (1999) which pictures DIIs as imperfect monitors of corporate activity in India. The equality of the coefficients for the two types of institutional investors can be rejected in F-test results at the bottom of the Table. This evidence suggests that the relation between cash holdings and institutional ownership may vary with the geographical origin of the institutional investor. These results support previous studies which associate foreign institutional ownership, rather than domestic institutional ownership, with more pronounced changes in firm-level corporate governance (e.g. Chen et al., 2007; Kim et al., 2016). Finally, it is noted that the coefficients of the rest of variables have the expected signs and are consistent with those reported by previous studies (e.g. Opler et al., 1999;

[5] The use of the lag operator offers only partial comfort to the problem. Therefore, explicit tests on endogeneity are presented in Section 1.5.
[6] Definitions of all variables are provided in the Appendix (Annex 1.A).

Bates et al., 2009). For example, levels of cash relate negatively to firms' leverage and assets, and positively to their operating cash-flows and market-to-book ratios.

The rest of the columns perform alternative model specifications to test the robustness of results. In particular, they use different measures of institutional ownership. Columns (2) and (3) add total institutional holdings (sum of foreign and domestic) separately to each type of institutional ownership to capture the incremental impact which arises from that particular type (e.g. Harford et al., 2016). Column (4) scales institutional ownership by firms' market capitalization instead of free-float to capture value-based changes in cash holdings (e.g. Aggarwal et al., 2011). Column (5) examines the concentration of foreign institutional ownership, i.e. by including the ratio of foreign to the sum of foreign and domestic institutional ownership, $FIIs/(FIIs + DIIs)$. Finally, column (6) includes firms' stock illiquidity (*Zero*) as an additional control variable to test whether results on institutional ownership are merely an artifact of cross-sectional variation in stock liquidity.[7]

In sum, evidence in this section shows that foreign institutional ownership related negatively to levels of cash held by Indian public firms and these results do not appear sensitive to alternative measures of institutional ownership. By contrast, there is some evidence that ownership held by DIIs may have been associated positively with firms' cash holdings. The section below examines the value implications of changes in firms' cash holdings as a way to provide governance interpretations to the above findings.

1.4.2 Institutional ownership and values of cash

Prior research suggests that the potential for monitoring by FIIs increases shareholder value in investee firms (e.g. Ferreira and Matos, 2008). This chapter tests whether foreign instituitional ownership related to higher firm values by updating investors' assessments about the risk that corporate insiders may turn firms' cash holdings into private benefits. The empirical investigation adopted in this section follows the approach in Pinkowitz et al.

[7] We use the number of zero daily stock returns as a proxy for firms' stock illiquidity. This measure has been proposed by previous studies to outperform alternatives (e.g. bid-ask spread) in capturing stock liquidity in emerging markets, and particularly in the Indian setting (e.g. Lesmond, 2005; Bekaert et al., 2007). The idea here is that when high transaction costs deter informed investors from trading (i.e. stocks are illiquid), more zero returns will be observed within the year as no new information has been incorporated into stock prices.

(2006). The authors use a valuation regression developed by Fama and French (1998) to study the relation between firm value and changes in cash holdings as well as changes in other variables capturing sources of value within the firm. Bates et al. (2009) adopt this approach to explain how the value of cash held by U.S. public firms has evolved over time. Similarly, Fresard and Salva (2010) use the model to study the incremental benefit to firm's value from cross-listing shares on more advanced capital markets. In particular, the model specification is the following:

$$V_{it} = \beta_0 + \beta_1 PBITDA_{it} + \beta_2 dPBITDA_{it} + \beta_3 dPBITDA_{it+1} + \beta_4 dAssets_{it} + \beta_5 dAssets_{it+1} + \beta_6 dR\&D_{it} + \beta_7 INTER_{it} + \beta_8 dINTER_{it} + \beta_9 dPBITDA_{it+1} + \beta_{10} DIV_{it} + \beta_{11} dDIV_{it} + \beta_{12} dDIV_{it+1} + \beta_{13} dV_{it+1} + \beta_{14} dCash_{it} + \beta_{15} dCash_{it+1} + \beta_{16}(After_{it} \times dCash_{it}) + \beta_{17}(After_{it} \times dCash_{it+1}) + \alpha_i + \theta_t + \varepsilon_{it} \quad (1.2)$$

The dependent variable V is the market value of firm i calculated as the sum of market value of equity and the book value of short-term debt and long-term debt. X_{it} is the level of variable X for firm i in year t divided by the level of its assets in year t; dX_{it} is the change in the level of X from year $t-1$ to year t, divided by assets in year t; dX_{it+1} is the change in X from year t to year $t+1$, also divided by assets in year t. Definitions of the variables entering the equation are provided in the Appendix (Annex 1.A).

In the model, contemporaneous changes in variables capture the direct relationship between changes in the variable and firm value, while next-period variables serve to absorb changes in investors' expectations about their contribution to firm value. *After* is a dummy variable that equals one for firm-years after which the firm started reporting positive values for foreign institutional ownership. Because some firms report positive values at the beginning of the sample period, we also conduct these tests for subsamples of firms which became foreign-invested during the period of study and those that did not.[8] Results of these tests are presented in Table 1.3.

[8] These represent around 35% of foreign-invested firm-year observations with an average of 2% of total shares.

Evidence from contemporaneous changes in cash holdings suggest that outside investors valued shifts in firms' cash holdings significantly more when the management may have been subject to monitoring by foreign institutions. In particular, changes in cash holdings were worth more in the presence of foreign institutions while their contribution to firm value was insignificantly small in the years before. The coefficients of next-period variables imply that valuation gains were not expected to be transitory, possibly because monitoring of cash was likely to be value-enhancing in the future.

It should be noted that the premium value associated with changes in cash holdings of foreign-invested firms is consistent with the premium investors assign to cash holdings of firms bonding to higher governance standards – for example, when firms cross-list shares on more advanced capital markets (e.g. Fresard and Salva, 2010). This implies that greater external monitoring, whether resulting from cross-listing shares on U.S. capital markets or from governance-sensitive institutional investors, can result in value-enhancing developments in firms' cash holdings.

The rest of the columns present results on subsamples of firms based on whether a firm became foreign-invested during the period of study. Results reveal that changes in cash holdings were valued significantly more in subsamples of firms with FIIs. This supports the view that foreign institutional ownership was conducive to uses of cash which were better aligned with the interests of outside shareholders or that were more restrictive to value-reducing managerial activities.

Section 1.6 explores how foreign institutional ownership might relate to uses of cash holdings in corporate decisions such as investments, payouts and executive compensation policies. Before discussing these results, we examine the potential problem of endogeneity in the relation between cash holdings and foreign institutional ownership.

1.5 Robustness tests

1.5.1 Endogenous investors' preferences

A potential concern with our inferences above is that FIIs do not choose stocks randomly. Hence, their correlation to firms' cash holdings may be subject to endogeneity. For example, FIIs may target firms based on whether the net benefits from changes in cash holdings are expected to be significant. Alternatively, a negative relation may arise if managers are depleting cash to increase the probability that they are targeted by international investors. Under these scenarios, our previous findings may confound treatment (self-selection) effects and reverse causality bias, respectively, rather than effective governance by FIIs.

To mitigate these concerns, we perform a number of tests. First, we implement a treatment (two-step Heckman) specification model to control for self-selection in the investment decision. Second, we perform an instrumental-variable approach to address concerns that foreign institutional ownership and cash holdings may be jointly determined by common unobserved factors. Finally, we examine reverse causality more explicitly, by studying changes in firms' cash holdings before and after a firm became foreign-invested.

The first test is a treatment effects model. It controls for the effect of unobserved factors associated with the investment decision by institutional investors. The model proceeds in two stages. In the first stage, we run a probit model in which a dummy variable indicating firm-years in which the firm was foreign-invested during the period of study ($FIIs^{dmy}$) is regressed on a set of firm-level financial characteristics (Z) recognized in the literature as important determinants of institutional investments (see the list of variables below). The model yields estimates for the self-selection parameter (inverse Mills ratio) which is included in the second stage additionally to the determinants of cash holdings to control for the possible selection bias. We repeat the same procedure for ownership held by domestic institutional investors ($DIIs^{dmy}$).

In particular, our model specification is the following:

$$FIIs_{it}^{dmy} = \gamma_1 Z_{it-1} + \theta_t + u_{it}$$

$$DIIs_{it}^{dmy} = \delta_1 Z_{it-1} + \theta_t + \eta_{it}$$

$$Cash_{it} = \beta_1 FIIs_{it} + \beta_2 DIIs_{it} + \lambda X_{it} + \beta_3 Mills(FIIs)_{it} + \beta_4 Mills(DIIs)_{it} + \alpha_i + \theta_t + \varepsilon_{it} \tag{1.3}$$

The choice of variables in set Z is inspired by previous research on the determinants of institutional ownership (e.g. Aggarwal et al., 2005; Leuz et al., 2010). These include firm size (*Assets*) to account for the possibility that FIIs may prefer to invest in firms which they can learn more about; the proportion of foreign sales to total sales (*FXSales*) to control for investors' preferences for firms with greater exposure and recognition; group affiliation (*Group*) to account for differences in firms' organizational structure; and firms' stock liquidity (*Zero*) to account for cross-sectional differences in firms' trading environment. Following the literature, we also include lagged levels of cash holdings to test for a potential reverse causality relation between foreign institutional ownership and cash holdings (e.g. Villalonga and Amit, 2006).

Results from the first-stage regressions are reported in the Appendix (columns (1) and (2) in Annex 1.B), while those of the outcome regression in column (1) of Table 1.4. Evidence shows that the relation between institutional ownership and cash holdings remains robust and dependent on the origin of the institutional investor, even after controlling for selection effects in institutional ownership. In support of our previous findings, cash is related negatively and significantly to foreign institutional ownership while positively and significantly to domestic institutional ownership.

To demonstrate robustness, we also perform a two-stage least squares (2SLS) estimation. This examines the problem that a firm's cash holdings and its level of institutional ownership may be jointly determined by common unobserved factors. We follow the literature in using the industry median of institutional ownership as instrumental variable for performing this test (e.g. Michaely and Vincent, 2012; Huang and Petkevich, 2016). The assumption here is that a firm is more likely to be foreign-invested if it belongs to industries in which foreign institutional investors tend to herd (e.g. Choi and Sias, 2009). However, the median level of institutional ownership in the industry is likely uncorrelated with the level of cash held by the individual firm, except through the level of foreign institutional ownership in the firm.

In particular, our model specification is the following.

$$FIIs_{it} = \mu_0 + \mu_1 IndustryFIIs_{it} + \boldsymbol{X}'_{it}\Theta + u_{it}$$

$$Cash_{it} = \beta_0 + \beta_1 \widehat{FIIs}_{it} + \boldsymbol{X}'_{it}\Theta + \varepsilon_{it} \quad (1.4)$$

where $IndustryFIIs$ is the time-varying median level of foreign institutional ownership in firm's industry, *FIIs* is the firm-level figure, *X* denotes the matrix of control variables for cash holdings (as presented in the previous section), and *u* presents the vector of first-stage errors.

First-stage regression results are presented in the Appendix (column (3) of Annex 1.B) while those of the second-stage regression in column (2) of Table 1.4. Evidence shows that foreign institutional ownership remains negatively related to cash holdings of investee firms. The respective coefficient suggests that a 10 percentage point increase in foreign institutional ownership was associated with a 0.6% decline in firm's cash holdings. This corresponds to 14% (=0.006/0.043) of the cash-to-assets ratio of the average firm belonging to industries targeted by FIIs.

As a final test, we investigate the dynamics of cash holdings with respect to foreign institutional ownership. This test will shed light on the causal relations between the two variables. Prior research has investigated causality by studying changes in corporate outcomes with respect to changes in institutional ownership (e.g. Aggarwal et al., 2011). In a similar vein, we regress changes in cash holdings on event-year indicators which take values one for firm-year observations before and after the firm becomes foreign-invested. In particular, our model specification is the following.

$$\Delta Cash_{it} = \beta_0 + \sum_{s=-2}^{-1} \Gamma_s \, Before(-s)_{it} + \sum_{s=0}^{2} \Gamma_s \, After(s)_{it} + X_{it} + \alpha_i + \theta_t + \varepsilon_{it} \quad (1.5)$$

In the model, *Before* is an indicator which equals one if it is (s) years before the firm becomes foreign-invested, and *After* is an indicator that equals one if it is (s) years following foreign institutional ownership. Results in column (3) show that the coefficients of the *After* variables are negative and statistically significant, while those of the *Before* variables are insignificant at conventional levels (both individually and in joint tests). This evidence implies that changes in foreign institutional ownership brought about changes in cash holdings and not the other way around. This evidence helps to ameliorate concerns over reverse causality in the relation between changes in foreign institutional ownership and changes in firms' cash holdings.

In the rest of the columns, we replace the dependent variable with firms' *excess* cash holdings. Excess cash is defined in the literature as the part of cash not committed to firm's operations, financing or investments (e.g. Dittmar et al., 2007; Fresard and Salva, 2010). Since it stands more at managers' discretion, it is indicative of the agency problems in cash holdings. Empirically, excess cash is estimated as the residual of a regression of cash on its determinants, following the methodologies proposed by Opler et al. (1999) and Dittmar et al. (2007). Results of these tests are presented in the Appendix (Annex 1.C).

Results on excess cash holdings are supportive of findings above. That is, the coefficients of the *After* variables remain negative and significant while again those corresponding to firm-years before institutional ownership are small and insignificant. Notably, results suggest that in the presence of foreign institutional ownership, the firm was likely to reduce its cash holdings for at least two years after being foreign-invested. This implies that managers in foreign-invested firms were likely to commit to persistently reducing firms' cash holdings.

1.5.2 Other robustness tests

Up until this point, we have documented a negative relation between foreign institutional ownership and cash holding. We have also embarked on a number of robustness tests to examine the possibility that this relation may capture endogenous effects. In this section, we examine cross-sectional differences in firms' governance. Our goal is to investigate whether reduced cash holdings were more pronounced in weakly-governed firms, as would be expected from an agency perspective. However, firm-level governance may itself be an endogenous variable to institutional investment. Therefore, drawing inferences on foreign governance would require cross-sectional differences in internal governance to be exogenous or predetermined to foreign institutional ownership.

India's adoption of governance reforms in 2000 (known as 'Clause 49' reforms) provides a quasi-experimental setting in which firms can be sorted based on exogenously-derived differences in corporate governance. Specifically, a series of government initiatives led to the adoption of mandates on improving firm-level corporate governance of publicly-traded firms. For the most part, these reforms included measures to support greater board independence, higher corporate disclosure, and greater powers to audit committees. Importantly, however, these measures did not apply to all publicly-traded firms, and even within the group of firms affected there was heterogeneity in the time of compliance.

In particular, the reform had an immediate effect on larger firms, while smaller firms were expected to comply with a time-lag. As the reform integrated with the listing qualifications of the country's main stock exchange (BSE), the distinction between 'large' and 'small' firms was based on firms' listing class. Firms classified by BSE as *Class A* firms had to implement the reform immediately (i.e. in 2001), while firms classified by BSE as *Class B* firms had to comply with the reform within the following years.

Black and Khanna (2007) use the reform as an experimental setting to study the value implications of corporate governance. They find that the announcement of the reform increased the value of *Class A* firms ('treatment' group) while it had an insignificant impact on the value of *Class B* firms ('control' group). In a subsequent work, Dharmapala and Khanna (2011) expand this framework to study an important element of the Clause 49 reform, i.e. the introduction of sanctions in 2004 against firms which had not complied with the reform. They show that corporate governance reforms in India in the early 2000s increased the value of the firm and a substantial source of value created related to the introduction of sanctions in 2004.

Drawing on the discussion above, the reform serves as a plausible exogenous source of variation in firm-level corporate governance. Although the reform did not set explicit rules for firms' cash holdings, it is likely that it had an indirect influence on firms' management of liquid assets through mandates for improved corporate governance (e.g. more efficient board structures). Also, because the post-reform period coincides with an influx of capital flows by FIIs in Indian stock markets, it is important to understand better whether the influence of FIIs on cash holdings is merely the artifact of the post-reform period.

To empirically test these arguments, we repeat equation (1.1) after explicitly accounting for firm-level changes in cash holdings due to the impact of the reform. In particular, we create a dummy variable ($Class\ B$) which takes values one for firms which were expected to comply with the reform during the sample period and zero for firms which had already implemented the reform at the start of the period (i.e. Class A firms). We interact this variable with an indicator which takes values one for years after 2004 (*Post04*), i.e. the year in which sanctions were introduced ($Class\ B \times Post04$). Moreover, we create an interaction term between firm's ownership held by FIIs and the *Post04* dummy ($FIIs \times Post04$) to investigate a similar relation with respect to foreign institutional ownership. Finally, we create a triple interaction term ($Class\ B \times Post04\ \times FIIs$) which captures changes in the influence of FIIs on cash holdings post-reform. That is, additionally to the influence of changes in a firm's legal environment, the incremental impact arising from the presence of FIIs in firm's ownership base. Specifically, our proposed model specification after including the aforementioned interaction terms and other determinants of cash included in the baseline equation (1.1) is the following.

$$Cash_{ijt} = \beta_1(Class\ B_i \times Post04_t) + \beta_2(FIIs_{it} \times Post04_t) + \beta_3(Class\ B_i \times Post04_t \times FIIs_{it}) + \gamma X_{it} + \left(\alpha_j \times \theta_t\right) + \varepsilon_{it} \qquad (1.6)$$

In the model, the dependent variable is the cash-to-assets ratio, with the subscripts *i, j* and *t* denoting firm, industry and time in years respectively. The right hand side variables include the reform-related and foreign-ownership-related variables presented above, a set of firm-level determinants of cash (*X*) described in equation (1.1), as well as industry and year fixed effects which control for common variation within industries over time. Results of these tests are presented in Table 1.5.

The first specification on the full sample shows that the introduction of sanctions had a negative and statistically significant influence on firms' cash holdings. Specifically, the average firm subject to compliance would reduce its cash-to-assets ratio by 1.5 percentage points following the introduction of sanctions. The respective coefficients of the rest of interaction terms suggest that foreign institutional ownership was likely to exert an influence on cash holdings above that derived from the passage of the reform. Indeed, the latter was likely to moderate the influence of FIIs, leading to an overall reduction in cash holdings of 1.7 percentage points (-0.046+0.029) for a percentage point increase in foreign institutional ownership. This evidence suggests that monitoring by FIIs was likely to complement governance rules stemming from the passage of the reform.

In the remaining columns, we repeat these tests after accounting for variation in firms' board characteristics. Firms are classified as having less efficient boards if their independency ratio was below the 50% threshold (defined in the 'Clause 49' governance reforms) and as having more efficient boards otherwise. Note that out of a total of 4,915 observations with available data, 3,540 observations belong to the first group while the remaining 1,375 observations ($1{,}375 + 3{,}540 = 4{,}915$) belong to the latter. Evidence from the two columns shows that the incremental influence of FIIs to that arising from changes in firms' legal environment was more pronounced in firms with less efficient boards. These results support governance interpretations in the relation between FIIs and cash holdings.

In a similar vein, Panel B examines value implications arising from changes in cash holdings separately for Class B and Class A firms due to the passage of the reform and inflows by FIIs (see equation (1.2)). FIIs were likely to increase the value of Class B firms through developments in firms' cash holdings while this was attenuated following the introduction of sanctions. These results corroborate findings on levels of cash holdings in Panel A as they relate to the interplay between governance stemming from the institutional architecture and ownership of the firm.

1.6 How do FIIs influence investee firms?

1.6.1 Evidence from changes in firm financial decisions

Theories suggest that the presence of large shareholders as monitors can have significant implications on firm behavior (e.g. Shleifer and Vishny, 1986; Edmans, 2014). This section examines changes in firm-level decisions which are associated with the presence of foreign institutional investors in a firm. In particular, it examines how firm payouts, investment and compensation policies evolve with foreign institutional ownership. Because managers may take preemptive actions with respect to these policies (see Section 1.5), actual levels of foreign institutional ownership are replaced with the predicted probabilities in foreign institutional investment for each firm (e.g. Becker et al., 2011).

These probabilities are estimated through a probit model which explains foreign institutional ownership as a function of firm-level financial characteristics. The dependent variable is a dummy variable which takes values one for firm-years with positive values for foreign institutional ownership. The right hand-side variables include a measure of firms' stock liquidity (the inverse of the number of trading days with zero stock returns) and other firm-level financial variables identified in prior research as important determinants of foreign institutional investment (e.g. Ferreira and Matos, 2008). These include firms' size, market-to-book ratios, profitability, leverage, ownership by DIIs and stock market performance.

The use of stock liquidity as identification variable follows the argument that it captures firm-specific costs of gathering information about the firm to influence firm management (e.g. Hartzell and Starks, 2003; Almazan et al., 2005). This is because more liquid stocks have greater information flow (e.g. due to more informative prices) and hence lower firm-specific monitoring costs. Alternatively, stock liquidity can reflect the cost of selling one's shares and walking away without incurring monitoring costs. More recent developments in the literature suggest that monitoring may also be exerted through the implicit (or actual) threat of selling one's shares, particularly by governance-sensitive institutional investors (e.g. Edmans, 2014; Firth et al., 2016).

In a second step, we estimate the relation between foreign institutional ownership and corporate outcomes using the fitted values from the step above and identify any variation in firms with large cash holdings.

$$Foreign_{it} = \left(\frac{1}{Zero}\right)_{it-1} + K_{it-1} + \alpha_i + \theta_t + \omega_{it}$$

$$y_{it} = Foreign^{*}_{it} + (Foreign^{*}_{it} \times Cash\ rich_{it}) + K_{it-1} + \alpha_i + \theta_t + \eta_{it} \qquad (1.7)$$

In the model, *y* is one of the financial variables associated with firms' investment, payout and executive compensation. On the right-hand side, *Foreign* is the fitted value from the first step presented above. *Cash rich* is a dummy variable taking values one for firms with positive excess cash holdings, as defined by Opler et al. (1999). It varies both in the cross-section and over time, as it identifies firm-years in which sample firms are estimated to hold (positive) excess cash. The interaction term will capture the impact of foreign institutional ownership on corporate outcomes of cash-rich firms. The model includes also firm-level characteristics (*K*) associated with the institutional investment decision (see above), as well as firm fixed-effects and year dummies to control for heterogeneity across firms and common time trends, respectively. Results of these tests are presented in Table 1.6.

The first column presents results from the first-stage regression. It shows that stock liquidity was positively and statistically significantly related to foreign institutional investment. Hence, foreign institutional ownership was likely sensitive to the liquidity and trading environment of the firm. This implies that FIIs were more likely to invest in stocks of firms from which they could walk away at a lower cost ('vote with their feet'), or alternatively interpreted, stocks of firms which they could gather information about and influence firm management less costly.

Evidence from the rest of the columns reveals that foreign institutional ownership was significantly related to firm management. Columns (2a) and (2b) show that it was positively related to the amount of cash dividends paid out by the firm. These results were more pronounced in cash-rich firms with few growth opportunities, as proxied by their market-to-book ratios relative to the industry median. This suggests that FIIs may have been governance-sensitive in firms in which managers were more susceptible to waste cash under low supervision. In a similar vein, columns (3a) and (3b) show that foreign institutional ownership was negatively related to investment spending of firms with low external finance needs, as measured by the Rajan and Zingales (1998) external finance dependence variable.[9]

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[9] External finance dependence (EFD) is calculated as the proportion of capital expenditures in excess of operating cash-flows, $(CAPEX - \ Cash\ flow)/CAPEX$.

Putting these findings together, FIIs were likely to view cash holdings as conducive to agency problems in firms holding substantial cash relative to their growth opportunities or the need to finance these opportunities externally. By increasing dividends, foreign-invested firms were likely to commit to persistently disgorging cash in the future (e.g. Brav et al., 2005), and reducing financial resources that would otherwise be spent on inefficient projects (e.g. Jensen, 1986).

The remaining columns consider implications of foreign institutional ownership on firms' executive compensation policies. Previous studies have shown that institutional investors in the U.S. play an important role in reducing excessive managerial compensation and in increasing the pay-for-performance sensitivity (e.g. Hartzell and Starks, 2003; Almazan et al., 2005). In Europe, Croci et al. (2012) find only a moderate impact in the determination of managerial compensation structures. The authors attribute these results to a substitution effect from supervision by controlling shareholders.

Data available from *Prowess* allows us to collect information about both total and cash compensation received from firms' directors.[10] Evidence shows a weak relation between foreign institutional ownership and total remuneration in support of European evidence (e.g. Croci et al., 2012). However, foreign institutional investment was associated with a lower salary-pay ratio in firms with substantial cash holdings. These results imply that FIIs may view executive compensation (e.g. salary and perks) as an additional channel through which corporate insiders in emerging markets extract private benefits. By inducing cash-rich firms towards more performance-based compensations (e.g. stock options), they were likely to reduce incentives to derive private benefits and promote more shareholder-friendly financial policies to the benefit of minority (outside) investors.

Overall, results in this section picture foreign institutional investors as a mechanism which can potentially reduce private rents associated with firms' cash reserves accruing to corporate insiders. Specifically, firms associated with foreign institutional ownership were likely to pay out cash that would otherwise have been spent on inefficient projects or excessive compensation. In addition, results suggest that a higher pay-performance

[10] Detailed data on other forms of compensation are scant across firms and largely unavailable in Prowess database.

sensitivity may have been one channel through which FIIs were likely to align better the interests of corporate insiders with those of outside investors.

1.6.2 Evidence from the boardroom

This section digs deeper into sources of institutional governance by examining decisions undertaken by the board. The idea here is that institutions with substantial ownership positions may have access to the board or senior management. Because we lack data as to whether FIIs had seats on the board or communicated directly with firm management, we collect information on the minutes of quarterly board meetings held by sample firms during the period of study from a special module in Prowess.

In particular, we scan the minutes searching for words ‘interim dividend’, ‘second interim dividend’ or ‘special dividend’. We focus on interim dividends because they are typically paid by the firm before the fiscal-year-end out of firms’ outstanding resources. Hence, they are likely to reflect spending of firms’ excess cash holdings, i.e. cash more likely to be associated with agency problems.

Table 1.7 presents results from a Tobit model in which the dependent variable is the number of meetings which authorize the payment of additional dividends in a fiscal year.[11] The use of the dummy variable *After* will capture changes in decisions on payouts made by the board in the presence of FIIs. To allow inferences comparable to findings in Table 1.6, we report results separately for firms with high and low market-to-book ratios relative to the industry median.

Evidence from the first two columns shows that in the presence of FIIs, the board was likely to authorize the payment of an additional cash dividend within the fiscal year. These results were more pronounced in firm-years with low market-to-book ratios relative to the industry median. They corroborate our previous findings by suggesting that the negative relation between FIIs and cash holdings was more pronounced in firms in which managers were more susceptible to waste cash.

[11] We use a censored model to account for firm-years in which no additional dividend was paid.

However, results from available data cannot exclude the possibility that the influence for additional dividends may be associated, to some extent, with institutional investors less likely to engage with costly monitoring (e.g. those with short-term investment horizons). This could be the case with special dividends in particular, which the literature presents as less likely to commit the manager to future payouts (e.g. DeAngelo et al., 2000).

Specification (3) elaborates on this discussion by examining whether foreign institutional ownership related to increases in the dividend per share. This measure incorporates regular dividends paid by the firm and has been proposed in the literature as a strong indicator of managerial commitment to reducing cash holdings (e.g. Brav et al., 2005). The use of event-year indicators before and after a firm becomes foreign-invested shows that dividends per share were likely to increase subsequently to foreign institutional ownership. This result reduces concerns over reverse causation and supports the view that changes in payouts and hence changes in cash holdings were likely to take place after -- not before -- foreign institutional ownership.

1.7 Heterogeneity in institutional activism

Finally, we examine implications of institutional ownership on cash holdings after exploring heterogeneity within the institutional investors' group. Previous findings have documented a discrepancy in cash holdings between institutions of different geographical origin. In particular, foreign ownership rather than institutional ownership was conducive to lower cash holdings. This result motivates us to explore whether the negative relation to cash holdings varies with the investment position of FIIs *relative* to that of DIIs in the firm. To do so, we repeat equation (1.1) after including interaction terms of the foreign and domestic institutional ownership variables with an indicator variable (*Above*) which identifies firm-years in which FIIs are the dominant institutional ownership group in the firm (i.e. FIIs > DIIs). Results of these tests are presented in Table 1.8.

Evidence in column (1) shows that the negative relation between foreign institutional ownership and cash holdings appears in firm-years in which FIIs overtake their domestic counterparts as the largest institutional ownership group (See also Figure 1.2). Under these conditions, FIIs become effectively the largest non-controlling shareholder in investee firms. Hence, they might overcome private costs in monitoring and additional costs arising from coordination problems with more ‘passive’ or pressure-resistant DIIs to exert effective monitoring. Interestingly, under these conditions, ownership by DIIs also becomes negatively related to firms’ cash holdings. This evidence combined suggests that institutions of different origin may team up or be better aligned in their assessment of firms’ cash holdings, once governance-sensitive institutions become relatively larger.

Substantiating monitoring interpretations, results in the rest of the columns show that effective monitoring was more pronounced in firms with weaker forms of internal governance, as proxied by their board structures. An implication of these findings is that in firms with heterogeneous institutional investor types, potentially monitoring institutions would benefit from their monitoring efforts once they became the dominant institutional group in the firm. Since some of the benefits from increased monitoring are shared with more passive or pressure-resistant shareholders, FIIs were likely to engage with costly monitoring once they were positioned as the largest non-controlling shareholding group. We expect such conditions to strengthen as emerging market companies integrate with the world economy and a greater proportion of free-float accrues to foreign institutions.

By contrast, foreign institutional ownership had limited implications on cash holdings of firms with stronger forms of internal governance. Notably, for such firms cash holdings were positively related to ownership held by DIIs. Since managers in such firms are *less* likely to expropriate firm’s cash holdings, these findings do not support the view that DIIs may side with managers of cash-rich firms to exploit dispersed shareholders. Instead, they may be consistent with the view that DIIs lack the advanced monitoring technologies and experience of FIIs to monitor firms with more severe agency problems. Hence, they may face relatively larger monitoring costs in containing agency problems of free cash-flow. From this perspective, DIIs may be considered as more ‘passive’ shareholders than FIIs, to the extent that their lack of a broader set of governance tools, skills, and experience limits their scope for monitoring firm management.

1.8 Conclusion

This chapter investigates the relation between cash holdings and ownership held by foreign institutional investors to understand better their role in monitoring firm management in emerging markets. Firm-level evidence from India shows that foreign institutional ownership was associated with subsequently lower levels of cash holdings. This relation is suggestive of greater monitoring as: i) it was associated with increases in the value of cash, ii) was more pronounced in firms with weaker forms of internal governance, iii) did not expand to ownership held by more ‘passive’ institutions.

The empirical analysis shows that foreign institutional investors were likely to influence managers of cash-rich firms to reduce cash holdings by increasing cash dividends. This was likely facilitated through their influence in the boardroom. These results support prior work which highlights the role of payouts in reducing the risk of expropriation under low investor protection (e.g. Pinkowitz et al., 2006; Firth et al., 2016).

Overall, this work builds on the literature on institutional activism. Previous studies have highlighted the role of institutional shareholders in shaping firm-level corporate governance around the world (e.g. Gillan and Starks, 2003; Ferreira and Matos, 2008; Aggarwal et al., 2011). This chapter proposes that foreign institutions may be a key mechanism to improving firm-level corporate governance in emerging markets, and firms’ cash holdings are a channel through which this may work. By focusing on the fundamental problem of holding cash, foreign institutions would directly reduce private rents from cash reserves accruing to corporate insiders, and indirectly promote more shareholder-friendly firm behavior on related financial policies.

However, data limitations do not allow us to infer whether changes in cash holdings can be attributed to institutional investors with long-term investment horizons or of certain types (e.g. hedge funds). Future work could shed more light on institutional activism on cash-related financial policies which arises from dimensions other than ownership levels.

Finally, an implication of our findings is that institutional ownership is likely to promote the convergence of cash holdings around the world. This will help to bridge cross-country variations and the underlying agency problems reported in previous studies (e.g. Dittmar et al., 2003). For example, Aggarwal et al. (2011) raise awareness of the issue of convergence in corporate governance systems internationally. Future work could broaden our understanding on how governance has evolved with developments in financial markets and institutions worldwide, and what the implications on firm-level decisions such as cash holdings are. We consider these as well as other topics related to cash holdings and/or institutions as interesting for future research.

Table of Figures

Figure 1.1 Net portfolio equity inflows in the Indian economy (2000-2010)

This figure depicts the real GDP growth and the net portfolio investment inflows in the Indian stockmarkets as % of GDP. Data cover the period 2000 to 2010. Source: *World Bank*

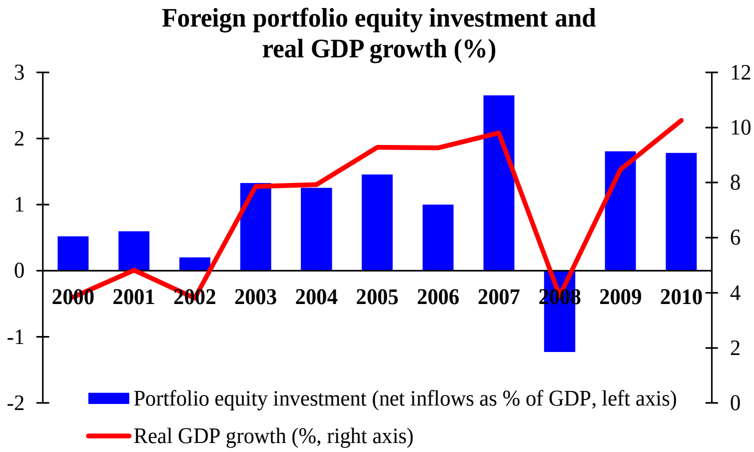

Figure 1.2 Shareholdings of foreign and domestic institutions in Indian firms

This figure depicts the evolution of the aggregate equity holdings of foreign institutional investors (FIIs) and domestic institutional shareholders (DIIs) in the free-float of the average sample firm over the period 2002-2008 on a quarterly basis. Firms included are firms with positive reported values for foreign institutional ownership. Source: *Prowess*

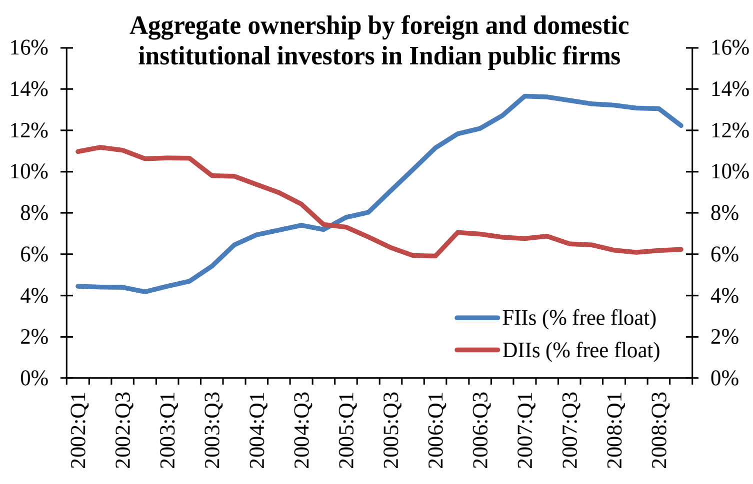

Table of Results

Table 1.1 Description of data

This Table presents the data extracted from *Prowess* and used in the empirical analysis. Panel A provides summary statistics for the main variables used in the multivariate analysis explaining firms' cash holdings. Information is provided for means, medians and standard deviations over the period 2001-2008. Definitions of all variables are provided in the Appendix (Annex 1.A). Panel B presents results from testing mean differences in selected variables between firms targeted by foreign institutional investors during the period of study (firms with FIIs) and the rest of the firms (firms without FIIs). All financial ratios are winsorized at the top and bottom 1% to limit the influence of outliers.

Panel A. Summary statistics

Variable	Mean	Median	Std. Dev.	Obs.
FIIs (% Freefloat)	0.035	0.000	0.129	7,512
DIIs (% Freefloat)	0.062	0.003	0.118	8,959
Cash	0.043	0.026	0.045	9,798
NWC	0.191	0.196	0.170	9,798
Assets	6.755	6.639	1.639	9,798
M2B	1.181	1.037	0.436	7,956
CAPEX	0.037	0.014	0.064	9,798
Leverage	0.211	0.199	0.172	9,798
R&D	0.001	0.000	0.006	9,798
Cashflow	0.080	0.073	0.082	9,559
CashVol	0.056	0.057	0.010	9,798
Equity issues	0.003	0.000	0.007	9,798
Debt issues	0.007	0.000	0.034	9,798

Panel B. Univariate analysis

Variable	Firms with FIIs	Firms without FIIs	Diff.	P-values	Obs.
FIIs (% Freefloat)	0.070	0.000	0.070	0.000	7,512
DIIs (% Freefloat)	0.067	0.059	0.007	0.002	8,959
Cash	0.042	0.045	0.003	0.002	9,798
Assets	6.710	6.788	0.078	0.019	9,798
CAPEX	0.038	0.036	0.002	0.060	9,798
Leverage	0.209	0.212	0.003	0.324	9,798
Group	0.393	0.444	0.051	0.000	9,798

Table 1.2 Institutional ownership and cash holdings

This Table tests the relationship between institutional ownership and cash holding in our sample of Indian public firms. Data cover the period 2001-2008. The dependent variable in all models is firms' cash-to-asset ratios. FIIs and DIIs are the aggregate ownership positions of foreign and domestic institutional investors in a firm-year, respectively. In column (1), they appear as a fraction of firms' investable shares (free-float). In columns (2) and (3), they appear independently and additionally to total institutional ownership (FIIs+DIIs). In column (4), institutional ownership is scaled by firms' market capitalization. Column (5) examines the concentration of foreign institutional ownership in total institutional ownership. The specification in column (6) additionally controls for firms' stock illiquidity. Definitions of control variables are provided in the Appendix (Annex 1.A). P-values from F-tests which test the equality of FIIs and DIIs are reported at the bottom of the Table. Standard errors are corrected for heteroskedasticity and are clustered at the firm level. P-values are depicted in parentheses with ***,**,* denoting statistical significance at 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
FIIs/Freefloat$_{t-1}$	-0.013**	-0.023**				-0.018***
	(0.034)	(0.044)				(0.004)
DIIs/Freefloat$_{t-1}$	0.009		0.023**			0.017
	(0.330)		(0.044)			(0.145)
(FIIs+DIIs)/Freefloat$_{t-1}$		0.009	-0.013**			
		(0.330)	(0.034)			
FIIs/Mktcap$_{t-1}$				-0.001*		
				(0.070)		
DIIs/Mktcap$_{t-1}$				0.001		
				(0.243)		
FIIs/(FIIs+DIIs)$_{t-1}$					-0.005*	
					(0.059)	
Zero$_{t-1}$						0.000
						(0.603)
Assets$_{t-1}$	-0.006***	-0.006***	-0.006***	-0.006***	-0.006**	-0.006**
	(0.003)	(0.003)	(0.003)	(0.002)	(0.011)	(0.020)
M2B$_{t-1}$	0.008***	0.008***	0.008***	0.008***	0.007***	0.006**
	(0.000)	(0.000)	(0.000)	(0.001)	(0.007)	(0.035)
CAPEX$_{t-1}$	0.010	0.010	0.010	0.011	0.009	0.001
	(0.282)	(0.282)	(0.282)	(0.263)	(0.382)	(0.957)
Leverage$_{t-1}$	-0.020***	-0.020***	-0.020***	-0.020***	-0.021**	-0.019**
	(0.005)	(0.005)	(0.005)	(0.005)	(0.013)	(0.030)
NWC$_{t-1}$	-0.004	-0.004	-0.004	-0.004	-0.001	-0.005
	(0.597)	(0.597)	(0.597)	(0.591)	(0.869)	(0.531)
R&D$_{t-1}$	0.363*	0.363*	0.363*	0.350*	0.406**	0.405*
	(0.055)	(0.055)	(0.055)	(0.064)	(0.041)	(0.073)
CashVol$_{t-1}$	0.115	0.115	0.115	0.114	0.177	0.114
	(0.483)	(0.483)	(0.483)	(0.486)	(0.314)	(0.540)
Cashflow$_{t-1}$	0.016**	0.016**	0.016**	0.016**	0.013	0.022***
	(0.033)	(0.033)	(0.033)	(0.034)	(0.145)	(0.008)
Equity issues$_{t-1}$	0.180***	0.180***	0.180***	0.182***	0.198***	0.163**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.024)
Debt issues$_{t-1}$	-0.016	-0.016	-0.016	-0.015	-0.008	-0.008
	(0.256)	(0.256)	(0.256)	(0.273)	(0.618)	(0.616)
DIV_dummy$_{t-1}$	0.002	0.002	0.002	0.002	0.002	0.002
	(0.145)	(0.145)	(0.145)	(0.144)	(0.281)	(0.311)
constant	0.074***	0.074***	0.074***	0.076***	0.078***	0.071***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm & Year F.E.	X	X	X	X	X	X
adj. R^2	0.027	0.027	0.027	0.026	0.028	0.027
Obs.	5,380	5,380	5,380	5,380	4,128	4,177
FIIs = DIIs (p-value)	(0.044)	(0.109)	(0.019)	(0.040)	-	(0.005)

Table 1.3 Firm value and changes in cash holdings

This Table examines changes in the value of cash with respect to foreign institutional ownership. The model applied is described in Section 1.4.2 (equation (1.2)). The dependent variable in all specifications is the sum of market value of equity (MktCap) plus the book value of short-term debt (STDebt) and long-term debt (LTDebt), scaled by total assets. Column (1) exploits changes in the value of cash in the aftermath of foreign institutional ownership. The rest of the columns examine differences in the value of cash between firms that become foreign-invested during the period of study and the rest of the firms. Definitions of control variables are provided in the Appendix (Annex 1.A). P-values of F-tests on differences in variables of interest are provided at the bottom of the Table. All specifications include firm and year fixed effects. Standard errors are clustered at the firm level and are corrected for heteroskedasticity. P-values are depicted in parentheses with ***,**,* denoting statistical significance at 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)
$PBITDA_t$	0.904***	0.886***	0.917***
	(0.000)	(0.000)	(0.000)
$dPBITDA_t$	0.134**	0.081	0.169*
	(0.047)	(0.446)	(0.052)
$dPBITDA_{t+1}$	0.610***	0.603***	0.611***
	(0.000)	(0.000)	(0.000)
$dAssets_t$	-0.171***	-0.147***	-0.185***
	(0.000)	(0.000)	(0.000)
$dAssets_{t+1}$	0.169***	0.172***	0.167***
	(0.000)	(0.000)	(0.000)
$R\&D_t$	-3.708***	-3.683	-3.659***
	(0.003)	(0.146)	(0.010)
$INTER_t$	-0.215	-0.497	0.049
	(0.564)	(0.367)	(0.923)
$dINTER_t$	-0.046	-0.045	-0.060
	(0.936)	(0.962)	(0.934)
$dINTER_{t+1}$	-1.135*	-1.828*	-0.536
	(0.093)	(0.094)	(0.531)
DIV_t	7.359***	8.282***	6.764***
	(0.000)	(0.000)	(0.000)
$dDIV_t$	4.340***	3.322	5.127**
	(0.009)	(0.190)	(0.019)
$dDIV_{t+1}$	2.114	2.681	2.063
	(0.106)	(0.196)	(0.222)
dV_{t+1}	-0.417***	-0.404***	-0.426***
	(0.000)	(0.000)	(0.000)
$dCash_t$	0.004	0.450**	-0.061
	(0.980)	(0.032)	(0.721)
$dCash_{t+1}$	0.391***	0.646***	0.413**
	(0.004)	(0.002)	(0.011)
$After_t \times dCash_t$	0.791**		
	(0.015)		
$After_t \times dCash_{t+1}$	0.675**		
	(0.038)		
Constant	0.362***	0.174	0.461***
	(0.000)	(0.212)	(0.000)
Firm & Year F.E.	X	X	X
adj. R^2	0.499	0.510	0.493
Obs.	8,055	3,075	4,980
$dCash_t = After_t \times dCash_t$	0.050		
$After_t \times dCash_t = After_t \times dCash_{t+1}$	0.717		
$dCash_t$ (2) = $dCash_t$ (3)		0.059	
$dCash_{t+1}$ (2) = $dCash_{t+1}$ (3)		0.368	

Table 1.4 Endogenous investors' preferences

This Table studies the potential endogeneity in the relation between cash holdings and institutional ownership. Column (1) presents the second-stage results of a treatment (two-stage Heckman) effects model described in Section 1.5.1 (See equation (1.3)). It explains firms' cash holdings after including the inverse-Mills ratio from a first-stage probit regression that examines the investment decision by foreign and domestic institutional investors (See Annex 1.B in the Appendix). Column (2) presents the second-stage results of a 2SLS model which explains cash holding after using the industry median of foreign institutional ownership as an instrument (See equation (1.4) and Annex 1.B in the Appendix for first-stage results). The remaining columns examine changes in total cash (column 3) and excess cash (columns 4 and 5) after using time-event indicators before and after the firm becomes foreign-invested (See equation (1.5)). Excess cash is estimated by the methodologies proposed by Opler et al. (1999) and Dittmar et al. (2007) in columns (4) and (5), respectively (See Annex 1.C). Definitions of the rest of variables are provided in the Appendix (Annex 1.A). P-values of tests on joint variables that $\sum Before_t = 0$ and $\sum After_t = 0$ are provided at the bottom of the Table. All equations include firm fixed-effects and year dummies. Standard errors are corrected for heteroskedasticity and clustered at the firm level. P-values are depicted in parentheses with ***,**,* denoting statistical significance at 1%, 5% and 10% levels respectively.

	Treatment	2SLS	ΔCash	ΔXCash	ΔXCash
	(1)	(2)	(3)	(4)	(5)
FIIs	-0.016***	-0.057*			
	(0.010)	(0.081)			
DIIs	0.027***	0.047***	0.012*	0.015	0.013
	(0.003)	(0.000)	(0.072)	(0.111)	(0.110)
Assets	-0.007**	-0.009***	-0.006***	-0.003**	-0.003***
	(0.015)	(0.005)	(0.000)	(0.013)	(0.006)
M2B	0.012***	0.015***	0.011***	0.006***	0.006***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CAPEX	-0.021**	-0.024	-0.077***	-0.042***	-0.037***
	(0.031)	(0.109)	(0.000)	(0.000)	(0.000)
Leverage	-0.043***	-0.056***	-0.008	-0.013**	-0.005
	(0.000)	(0.000)	(0.185)	(0.014)	(0.324)
NWC	-0.015*	-0.007	0.008	0.005	0.006
	(0.071)	(0.584)	(0.164)	(0.360)	(0.242)
R&D	0.458**	0.538	0.368***	0.255*	0.249*
	(0.023)	(0.102)	(0.002)	(0.069)	(0.052)
CashVol	0.177	0.446	0.117	-0.063	-0.098
	(0.355)	(0.168)	(0.417)	(0.705)	(0.538)
Cashflow	0.063***	0.065***	0.113***	0.041***	0.041***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Equity issues	0.462***	0.570***	0.731***	0.518***	0.489***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Debt issues	0.073***	0.078***	0.095***	0.066***	0.071***
	(0.000)	(0.002)	(0.000)	(0.000)	(0.000)
DIV_dummy	0.007***	0.008**	0.000	0.001	-0.001
	(0.000)	(0.011)	(0.866)	(0.292)	(0.666)
Mills (FIIs)	0.053***				
	(0.000)				
Mills (DIIs)	-0.006				
	(0.618)				
Before2			-0.003	-0.002	-0.002
			(0.262)	(0.489)	(0.350)
Before1			-0.002	-0.001	-0.001
			(0.372)	(0.540)	(0.508)
After0			-0.005**	-0.006***	-0.005***
			(0.020)	(0.001)	(0.002)
After1			-0.004*	-0.004**	-0.004**
			(0.091)	(0.027)	(0.031)
After2			-0.003	-0.006**	-0.005**
			(0.212)	(0.016)	(0.027)
constant	-0.012	0.074***	0.014	0.012	0.013
	(0.710)	(0.006)	(0.128)	(0.285)	(0.224)
Firm & Year F.E.	X	X	X	X	X
adj. R^2	0.124	0.107	0.089	0.040	0.039
Obs.	4,633	1,595	7,669	6,368	6,367
$\Sigma Before_t = 0$			0.175	0.399	0.294
$\Sigma After_t = 0$			0.014	0.001	0.001

Table 1.5 Cross-sectional differences in governance

This Table documents results on the relation between foreign institutional ownership and cash holdings of Indian firms, after accounting for cross-sectional differences in firm-level governance derived from the adoption of *Clause 49* governance reforms in the early 2000s (See Section 1.5.2). The dependent variable is firms' cash-to-asset ratios. *Class B* is a dummy which takes values one for firms not required to improve governance immediately after the reform (Class B firms), and zero for firms which had to respond immediately (Class A firms). *Post04* is dummy variable which takes values one for years after 1994, during which sanctions over non-compliance were introduced. The rest of determinants are defined in the Appendix (Annex 1.A). Columns (2) and (3) present results on subsamples of firms based on their board composition. Panel B presents results on values of cash separately for Class B and Class A firms (see Table 1.3). P-values of corrected standard errors clustered at the firm level are depicted in parentheses with ***,**,* denoting statistical significance at 1%, 5% and 10% levels respectively.

Panel A. Internal governance and levels of cash

		Board ind. ratio ≤ 50%	Board ind. ratio > 50%
	(1)	(2)	(3)
Class B × Post04	-0.015***	-0.019***	0.000
	(0.000)	(0.000)	(0.973)
FIIs × Post04	-0.046***	-0.060***	-0.029
	(0.005)	(0.004)	(0.337)
Class B × Post04 × FIIs	0.029*	0.042**	0.023
	(0.073)	(0.042)	(0.439)
Assets	-0.008***	-0.010***	-0.001
	(0.000)	(0.000)	(0.577)
M2B	0.017***	0.012***	0.028***
	(0.000)	(0.000)	(0.000)
CAPEX	-0.018*	-0.017	-0.020
	(0.050)	(0.119)	(0.242)
Leverage	-0.043***	-0.041***	-0.046***
	(0.000)	(0.000)	(0.000)
NWC	-0.020***	-0.029***	-0.003
	(0.001)	(0.000)	(0.807)
R&D	0.420**	0.635***	0.178
	(0.014)	(0.002)	(0.637)
Cashflow	0.057***	0.061***	0.049***
	(0.000)	(0.000)	(0.000)
Equity issues	0.511***	0.592***	0.301***
	(0.000)	(0.000)	(0.005)
Debt issues	0.048***	0.058***	0.025
	(0.001)	(0.001)	(0.318)
DIV_dummy	0.007***	0.005***	0.009***
	(0.000)	(0.005)	(0.002)
constant	0.096***	0.114***	0.025
	(0.000)	(0.000)	(0.203)
Industry & Year F.E.	X	X	X
R^2	0.103	0.086	0.217
Obs.	4,915	3,540	1,375

Panel B. Internal governance and values of cash

	Class B firms	Class A firms
$PBITDA_t$	0.952***	1.725***
	(0.000)	(0.010)
$dPBITDA_t$	0.326***	0.244
	(0.000)	(0.534)
$dPBITDA_{t+1}$	0.679***	0.818**
	(0.000)	(0.014)
$dAssets_t$	-0.241***	-0.138***
	(0.000)	(0.006)
$dAssets_{t+1}$	0.247***	0.090
	(0.000)	(0.106)
$R\&D_t$	-4.631**	-2.262
	(0.021)	(0.261)
$INTER_t$	1.227***	-0.544
	(0.003)	(0.771)
$dINTER_t$	-2.168***	-0.317
	(0.001)	(0.921)
$dINTER_{t+1}$	0.471	-3.729
	(0.520)	(0.330)
DIV_t	8.607***	9.647
	(0.000)	(0.134)
$dDIV_t$	6.946***	1.417
	(0.001)	(0.857)
$dDIV_{t+1}$	3.585**	0.248
	(0.025)	(0.963)
dV_{t+1}	-0.452***	-0.250***
	(0.000)	(0.000)
$dCash_t$	-0.135	2.567*
	(0.671)	(0.061)
$dCash_{t+1}$	0.510***	1.152**
	(0.001)	(0.013)
$After_t$	0.019	-0.040
	(0.603)	(0.599)
$Post04_t$	0.186***	0.281***
	(0.000)	(0.000)
$After_t \times Post04_t$	-0.050	0.004
	(0.180)	(0.949)
$After_t \times dCash_t$	3.271***	-7.983***
	(0.003)	(0.000)
$Post04_t \times dCash_t$	0.295	-2.336
	(0.406)	(0.113)
$After_t \times Post04_t \times dCash_t$	-2.586**	8.215***
	(0.030)	(0.000)
constant	0.292***	0.931*
	(0.003)	(0.096)
Firm F.E.	X	X
adj. R^2	0.476	0.458
Obs.	5,671	431

Table 1.6 Foreign institutional ownership and firm financial decisions

This Table presents results from examining the relation between foreign institutional ownership and firm financial decisions. The first model presents results from the first-stage regression presented in Section 1.6.1 (equation (1.7)). The rest of the columns present results from the outcome regression on cash dividends (columns (2a) and (2b)), investment (columns (3a) and (3b)), and compensation to firms' directors (columns (4) and (5)). *Dividends* is the ratio of cash dividends to assets. *Total pay* is the natural logarithm of total remuneration received by board executives. *Salary/Total pay* is the fraction of total pay in the form of salary paid to executives. *Cash rich* is a dummy taking values one for firm-years with positive excess cash holdings, estimated by the methodology proposed by Opler et al. (1999) (See Annex 1.C). *EFD* is a measure of firms' external finance dependence, calculated for each firm as (CAPEX – Cash flow)/CAPEX. *Stock returns* are abnormal returns calculated as raw returns minus contemporaneous returns on the value-weighted market index, using as weights firms' values for market capitalization. The rest of variables are defined in the Appendix (Annex 1.A). All equations include fixed firm-effects and year dummies. P-values of heteroskedasticity-consistent errors are depicted in parentheses with ***,**,* denoting statistical significance at 1%, 5% and 10% levels respectively.

		Dividends		CAPEX		Executive Compensation	
	Foreign	Below Industry M2B	Above Industry M2B	Below Industry EFD	Above Industry EFD	Total Pay	Salary/ Total Pay
	(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
1/Zero$_{t-1}$	0.136**						
	(0.029)						
Foreign*		0.002	0.007	-0.142	0.103	-0.999	0.438*
		(0.864)	(0.534)	(0.218)	(0.230)	(0.468)	(0.059)
Foreign* × Cash rich		0.005**	-0.000	-0.034*	0.010	0.373*	-0.098***
		(0.013)	(0.791)	(0.058)	(0.471)	(0.100)	(0.006)
Assets$_{t-1}$	-0.008	-0.003***	-0.001***	-0.014**	-0.012***	0.506***	0.003
	(0.560)	(0.000)	(0.005)	(0.014)	(0.005)	(0.000)	(0.865)
M2B$_{t-1}$	-0.172***	0.002	0.001	0.001	0.027***	0.232*	-0.007
	(0.001)	(0.124)	(0.511)	(0.864)	(0.000)	(0.083)	(0.717)
Cashflow$_{t-1}$	0.448*	-0.001	0.002	-0.004	0.019	1.004***	-0.156**
	(0.098)	(0.674)	(0.428)	(0.878)	(0.394)	(0.004)	(0.014)
Leverage$_{t-1}$	0.046	-0.009***	-0.010***	-0.069***	-0.047**	-0.698**	0.135**
	(0.722)	(0.000)	(0.000)	(0.009)	(0.012)	(0.038)	(0.013)
DIIs$_{t-1}$	0.168	-0.002	-0.006***	-0.063**	-0.017	-0.208	0.009
	(0.403)	(0.439)	(0.001)	(0.018)	(0.374)	(0.712)	(0.874)
Stock returns$_{t-1}$	0.016	0.000*	0.000	0.000	-0.002	0.002	-0.005
	(0.351)	(0.061)	(0.329)	(0.969)	(0.108)	(0.905)	(0.174)
Stock returns$_{t+1}$	0.036	0.000	0.000	0.002*	-0.000	0.040**	-0.012***
	(0.192)	(0.632)	(0.424)	(0.099)	(0.957)	(0.048)	(0.003)
constant	-0.892***	0.023***	0.019***	0.154***	0.075**	10.994***	0.669***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.039)	(0.000)	(0.000)
Firm & Year F.E.	X	X	X	X	X	X	X
pseudo or adj. R^2	0.017	0.062	0.098	0.089	0.057	0.140	0.031
Obs.	4,175	1,855	1,908	1,279	2,399	2,920	2,742

Table 1.7 Evidence from board meetings

This Table presents results from examining board meetings which authorize additional dividends within the year. The regression in columns (1) and (2) is a Tobit model in which the dependent variable is the number of meetings which authorize the payment of an 'interim dividend', 'second interim dividend' or 'special dividend' within a fiscal year, Ln(1+board meetings). Results are presented separately for firms with market-to-book ratios (M2B) below and above the industry median. The regression in column (3) is a probit model in which the dependent variable takes value one if the firm increased its dividend per share from one year to another and zero otherwise. Time-event indicators *Before* and *After* take values one for firm-years before and after a firm becomes foreign-invested, respectively, and zero otherwise. All remaining variables are defined in the Appendix (Annex 1.A). P-values of heteroskedasticity-corrected standard errors are depicted in parentheses with ***,**,* denoting statistical significance at 1%, 5% and 10% levels respectively.

	Board meetings that authorize the payment of additional dividend within the year		Change in the dividend per share (ΔDPS)
	Below IndustryM2B	Above IndustryM2B	
	(1)	(2)	(3)
After	0.293*	-0.038	
	(0.058)	(0.770)	
Assets	0.305***	0.330***	0.116***
	(0.000)	(0.000)	(0.000)
Cash	2.972**	2.769***	1.811***
	(0.044)	(0.005)	(0.000)
SGrowth	0.272	0.214	0.053
	(0.327)	(0.316)	(0.647)
PBITDA	7.688***	8.308***	7.033***
	(0.000)	(0.000)	(0.000)
Age	0.371***	0.084	0.274***
	(0.008)	(0.538)	(0.000)
DIIs	-1.048	-0.114	-0.917***
	(0.199)	(0.783)	(0.000)
Board size	0.047	0.173	0.228***
	(0.846)	(0.358)	(0.009)
Board interlock	-0.003	-0.006**	-0.001
	(0.403)	(0.042)	(0.446)
Promoters	0.010**	0.009***	0.001
	(0.022)	(0.004)	(0.343)
Group	-0.239	-0.056	-0.083
	(0.113)	(0.675)	(0.126)
Before2			-0.057
			(0.631)
Before1			-0.143
			(0.130)
After0			-0.003
			(0.973)
After1			0.172
			(0.150)
After2			0.251*
			(0.057)
constant	-8.631***	-6.780***	-3.849***
	(0.000)	(0.000)	(0.000)
Year & Industry dummies	X	X	X
pseudo R^2	0.186	0.194	0.143
Obs.	3,634	4,956	4,520
After (1) = After (2)	0.088		

Table 1.8 Differences in monitoring between institutions of different origin

This Table explores differences in cash holdings between FIIs and DIIs. All specifications report results from an extended version of equation (1.1), in which a dummy variable taking values one for firm-years in which aggregate ownership by FIIs is larger than that by DIIs is included (*Above*). Column (1) presents results for the full sample. Columns (2) and (3) report results for firms with board representation by independent directors above and below the 50% threshold, respectively. Definitions of all variables are provided in the Appendix (Annex 1.A). P-values of heteroskedasticity-corrected error terms are depicted in parentheses with ***,**,* denoting statistical significance at 1%, 5% and 10% levels respectively.

	All firms	Board ind. ratio ≤ 50%	Board ind. ratio > 50%
	(1)	(2)	(3)
$FIIs_{t-1}$	0.059*	0.083**	-0.023
	(0.098)	(0.023)	(0.490)
$FIIs_{t-1} \times Above_{t-1}$	-0.069*	-0.097***	0.027
	(0.060)	(0.009)	(0.443)
$DIIs_{t-1}$	0.004	-0.005	0.022**
	(0.574)	(0.588)	(0.038)
$DIIs_{t-1} \times Above_{t-1}$	-0.082**	-0.109**	-0.063
	(0.035)	(0.018)	(0.230)
$Assets_{t-1}$	-0.006***	-0.005**	-0.008**
	(0.003)	(0.034)	(0.026)
$M2B_{t-1}$	0.008***	0.005*	0.014***
	(0.001)	(0.052)	(0.001)
$CAPEX_{t-1}$	0.010	-0.001	0.045**
	(0.283)	(0.906)	(0.013)
$Leverage_{t-1}$	-0.021***	-0.022**	-0.020
	(0.004)	(0.011)	(0.115)
NWC_{t-1}	-0.004	-0.002	-0.009
	(0.583)	(0.788)	(0.472)
$R\&D_{t-1}$	0.334*	0.393	0.219
	(0.069)	(0.117)	(0.374)
$CashVol_{t-1}$	0.110	0.077	0.133
	(0.503)	(0.706)	(0.644)
$Cashflow_{t-1}$	0.015**	0.015	0.018
	(0.038)	(0.111)	(0.149)
Equity $issues_{t-1}$	0.181***	0.170**	0.217*
	(0.006)	(0.034)	(0.058)
Debt $issues_{t-1}$	-0.016	-0.013	-0.019
	(0.252)	(0.420)	(0.437)
DIV_dummy_{t-1}	0.002	0.002	0.003
	(0.134)	(0.306)	(0.317)
constant	0.075***	0.072***	0.084***
	(0.000)	(0.000)	(0.006)
Firm & Year F.E.	X	X	X
adj. R^2	0.031	0.027	0.050
Obs.	5,380	3,872	1,508

Appendix to Chapter 1

Annex 1.A Variables definition

VARIABLE	DEFINITION (Source: Prowess)
Age	Ln(Number of years since incorporation)
Assets	Ln(Assets), where Assets appear as net of cash
Board interlock	Number of other companies board members serve as directors
Board size	Ln(Number of board members)
CAPEX	(Δ.Fixed assets + Depreciation)/Assets
Cash	(Cash and marketable securities)/Assets
Cashflow	Operating cash-flow/Assets
CashVol	Standard deviation of past Industry Cashflow/Assets
Debt issues	(Debt issuance – Debt retirement)/Assets
DIIs	Firm ownership held by domestic institutional shareholders
DIV	Dividend payouts/Assets
DIV_dummy	Indicator identifying firms which paid out a cash dividend during the year
Equity issues	(Equity issues – Equity repurchases)/Assets
FIIs	Firm ownership held by foreign institutional shareholders
IndustryFIIs	Median level of foreign institutional ownership within firm's industry
Freefloat	100 - Holdings by firms' promoters
FXSales	Foreign sales/Total sales
Group	Indicator identifying firms affiliated to a business group
INTER	Expenses for interest payments/ Assets
Leverage	(Short-term debt + Long-term debt)/Assets
M2B	(Assets + Market capitalization – Book value of Equity)/Assets
MktCap	Ln(Market capitalization)
NWC	(Current assets - Current liabilities)/Assets
PBITDA	Profit before interest, taxes and depreciation/Assets
Promoters	% of shares held by controlling shareholders
R&D	Research expenditures/Sales
Sales	Ln(Total sales)
SGrowth	Δ.Sales/$Sales_{t-1}$
Zero	Ln(1+ number of trading days with zero stock returns)

Annex 1.B First-stage results of endogeneity tests

This Table presents first-stage regression results from endogeneity tests reported in Table 1.4. The first two columns report results from probit models which explain investment by FIIs and DIIs, respectively, as a function of firm-level characteristics (See equation (1.3)). The dependent variable is a dummy variable taking values one for firm-years in which the firm became foreign-invested. The third model reports the first-stage results from a two-stage least squares (2SLS) specification (equation (1.4)) which uses the industry-median of foreign institutional ownership as instrument (*FIIs* are *IndustryFIIs*) and in which firm-years included are those with positive values for FIIs. Definitions of the rest of variables are provided in the Appendix (Annex 1.A). All models report heteroskedasticity robust standard errors, clustered at the firm level. P-values are reported in parentheses with ***,**,* denoting statistical significance at 1%, 5% and 10% levels respectively.

	$FIIs^{dmy}$	$DIIs^{dmy}$	2SLS
FIIs		-0.392**	0.647***
		(0.013)	(0.000)
DIIs	0.314*		0.045
	(0.083)		(0.471)
Cash	-1.493***	-0.405	
	(0.001)	(0.416)	
Assets	0.023	0.299***	0.059***
	(0.122)	(0.000)	(0.000)
M2B	-0.166***	0.067	0.028*
	(0.001)	(0.222)	(0.099)
Leverage	-0.187	-0.425***	-0.185***
	(0.122)	(0.001)	(0.002)
CAPEX			-0.176***
			(0.002)
NWC			0.212***
			(0.000)
R&D			3.321**
			(0.049)
CashVol			0.945
			(0.585)
Cashflow			0.084
			(0.185)
Equity Issues			-0.184
			(0.765)
Debt issues			0.001
			(0.995)
DIV_dummy			-0.022
			(0.156)
PBITDA	0.925***	-1.072***	
	(0.004)	(0.002)	
FXSales	-0.001	-0.001	
	(0.563)	(0.382)	
Group	-0.157***	0.694***	
	(0.001)	(0.000)	
Zero	-0.032	-0.028	
	(0.150)	(0.232)	
constant	-0.983***	-1.438***	-0.451***
	(0.000)	(0.000)	(0.000)
Year dummies	X	X	X
pseudo or adj. R^2	0.028	0.183	0.022
Obs.	5,265	4,896	1,595

Annex 1.C Estimating excess cash

This Table presents results from estimating firms' excess cash holdings. Excess cash is the residual cash held by the firm above levels needed for operations, financing and investments. In particular, we employ two alternative specifications proposed by prior research. The first one is developed in the work of Opler et al. (1999):

$$Cash_{it} = \delta_0 + \delta_1 Ln(Assets)_{it} + \delta_2 Cashflow_{it} + \delta_3 NWC_{it} + \delta_4 CashVol_{it} + \delta_5 M2B_{it} + \alpha_i + \theta_t + \varepsilon_{it}$$

while the second one is proposed by Dittmar et al. (2007):

$$Cash_{it} = \gamma_0 + \gamma_1 Ln(Assets)_{it} + \gamma_2 Cashflow_{it} + \gamma_3 NWC_{it} + \gamma_4 CashVol_{it} + \gamma_5 M2B_{it} + \gamma_6 Leverage_{it} + \gamma_7 CAPEX_{it} + \gamma_8 DIV\_dummy_{it} + \alpha_i + \theta_t + \eta_{it}$$

We estimate these models for the period of study and compute excess cash as the residual cash, after including firm fixed effects. In the analysis, we consider only firm-year observations with positive values for estimated excess cash, following the respective literature (e.g. Fresard and Salva, 2010). Definitions of variables are provided in the Appendix (Annex 1.A). Standard errors are clustered at the firm level and corrected for heteroskedasticity. P-values are reported in parentheses with ***,**,* denoting statistical significance at 1%, 5% and 10% levels respectively.

	Opler et al. (1999)	Dittmar et al. (2007)
Assets	-0.009***	-0.006***
	(0.000)	(0.001)
Cashflow	0.055***	0.047***
	(0.000)	(0.000)
NWC	-0.018**	-0.019***
	(0.012)	(0.008)
CashVol	0.290	0.240
	(0.113)	(0.196)
M2B	0.019***	0.018***
	(0.000)	(0.000)
Leverage		-0.043***
		(0.000)
CAPEX		-0.010
		(0.205)
DIV_dummy		0.007***
		(0.000)
constant	0.071***	0.060***
	(0.000)	(0.000)
Firm & Year F.E.	X	X
adj. R^2	0.094	0.101
Obs.	6,707	6,554

~ CHAPTER TWO ~

Precautionary motives in capital-raising of emerging market companies: Evidence from India

Abstract

This chapter studies external finance in the form of equity and debt to investigate to what extent firms issue outside finance to save proceeds as cash consistent with precautionary motives. Firm-level analysis on India shows that firms with low internal funds to meet investment demand raised new equity above contemporaneous finance needs and saved proceeds as cash during the early and middle 2000s. These proceeds were positively related to firm investment during the 2008-9 global financial crisis. By contrast, new debt issues were weakly related to cash savings, except during crisis. Overall, results suggest that equity issues can play an important function to shield firm investment against adverse external market conditions in emerging economies, consistent with precautionary motives.

2.1 Introduction

Since the outburst of the 2008-9 global financial crisis, there has been much discussion in academia and the financial press about the increasingly large cash holdings of non-financial corporates worldwide. As a result, an evolving strand in the literature has promoted understanding of the levels and values of cash holdings in different institutional contexts (e.g. Bates et al., 2009). However, much less is known about the sources of these funds and firms' choice of funds to build cash holdings consistent with precautionary motives.

This chapter investigates to what extent firms in a representative emerging market, India, issue outside finance to save proceeds in the form of cash. Recent work has studied the link between cash holdings and equity issues (e.g. McLean, 2011). However, it leaves some important topics unexplained. Which firms are likely to build cash out of issue proceeds? To what extent firms choose between equity and debt for building cash holdings? Which firm-level factors limit this issuance-saving link? This chapter expands the issuance-saving link to include both equity and debt, and identifies the implications of this decision on firm investment across states of the world.

It is generally assumed in the literature that firms save cash out of internal cash-flows. This view is based on pecking order theories which predict that firms with information asymmetry problems will secure 'financial slack' to avoid raising costly external finance (Myers, 1984; Myers and Majluf, 1984). Hence, firms which have exhausted their ability to raise additional financial resources may have to forego current investment by allocating scarce internal capital to liquid asset holdings (e.g. Almeida et al., 2004; Han and Qiu, 2007). This argument gives rise to a negative relation between current investment and saving (i.e. future investment) for firms likely to be financially constrained. By contrast, firms with an unrestricted access to external finance should face no trade-off between savings and investments. This is because, by definition, these firms can raise new capital for investment purposes at a fair cost when needed, and there is no precautionary need for cash in the first place.

However, the aforementioned conditions for cash hoarding can be rather restrictive. The literature suggests that firms can be constrained to raise capital at one point in time but be better positioned to raise capital in others. For example, Choe et al. (1993) show that firms' equity issuance intensity varies with external market conditions. In their work, this reflects the varying costs of raising external finance driven by information asymmetry. More recent developments in the literature suggest that equity issuance is mainly driven by firms' need to build precautionary cash holdings (e.g. McLean, 2011).

In this chapter, we argue that firms may choose sources of funds to build cash holdings and thereby transfer financing capacity to future states of the world. Faced with such a problem, a firm which is short of funds can raise outside funding in the form of equity or debt. The distinguishing feature of the equity vs. debt choice for building cash holdings is that proceeds from equity and debt allow a different degree of flexibility to the firm to store proceeds in the form of idle cash in the future. Although few studies have highlighted the link between equity issuance and cash holdings (e.g. Bolton et al., 2013), the equity vs. debt choice for cash savings remains unexplored, to the best of our knowledge.

Our starting point is the argument that proceeds from equity may be more conducive to increasing the stock of cash than proceeds from debt. This is based on predictions of theoretical and empirical analyses. For example, firms which resort to outside equity may be subject to less stringent monitoring over the use of proceeds compared to the alternative of raising debt (e.g. Frank and Goyal, 2003; Faulkender and Petersen, 2006). In addition, they can cut or suspend payouts when an external finance shock occurs, further enhancing firms' liquidity positions (e.g. Bliss et al., 2015) Moreover, equity-dependent firms (e.g. R&D-intensive firms) typically face high adjustment costs in investment and rely primarily on outside sources for funding (e.g. Brown and Petersen, 2009). Hence, they are likely to save cash holdings from issue proceeds to alleviate future financial constraints. These analyses suggest that proceeds from equity finance can increase a firm's cash holdings consistent with precautionary motives.

By contrast, firms which raise new capital in the form of debt are induced to spend proceeds on investments that generate sufficient income to repay that debt. This is because the suspension of an interest payment, unlike that of a dividend payment, can incur bankruptcy and liquidation of the firm. To the extent that liquid assets produce low (or zero) returns, firms raising debt are induced to spend proceeds on non-liquid (physical) assets. In addition, debt can work by itself as a governance mechanism in firms with weaker forms of internal governance. In particular, it can bond managers to spend cash holdings in the form of a fixed interest obligation (e.g. Jensen, 1986). From this perspective, debt can be of little help to a firm which raises new capital for the purpose of keeping proceeds in the form of idle cash. These arguments combined suggest that debt proceeds are less likely to support a post-issuance cash holding behavior than equity proceeds.

However, proceeds of longer maturity debt can have favourable implications on cash savings. This is because firms can be left with cash proceeds for a longer period of time before repayment (compared to short-term debt). This should be particularly important to firms with lower credit quality, as they are more likely to face refinancing risks and underinvestment problems when external market conditions weaken (e.g. Erel et al., 2012). As a result, firms anticipating credit constraints can increase the maturity of their debt structure when times are good and credit spreads favourable, to enhance their internal liquidity and preserve credit capacity when times are bad. Therefore, one may expect that long-maturity debt can coexist with large cash holdings consistent with precautionary motives.

This work empirically explores these arguments by using financial information from Indian public firms before and during the 2008-9 global financial crisis. The setting of an emerging market is interesting in itself, since prior research has predominantly associated firms' cash holdings with acute agency problems (e.g. Dittmar et al., 2003; Kalcheva and Lins, 2007). Nevertheless, firms in emerging markets may face severe capital market imperfections, pertinent to inadequately developed financial and hedging markets. Therefore, it is important to understand better whether precautionary motives can explain cash holdings of domestic firms.

Overall, we find evidence that firms with low internal funds to meet investment demand were likely to raise new equity above current finance needs and save the proceeds in the form of cash. These proceeds were positively related to firm investment in the aftermath of the 2008-9 global financial crisis, in support of precautionary motives in issuance. By contrast, proceeds from debt were weakly related to increases in firms' cash holdings. Importantly, firms facing higher (debt) refinancing risks were likely to tap equity markets -- not raise debt of longer maturities -- to build financial slack. This discrepancy in the equity vs. debt choice for cash savings suggests that equity provides relatively greater flexility to the firm to store proceeds as idle cash, and thereby transfer financing capacity from good to bad states of the world.

In sum, this work provides a first empirical investigation to the equity vs. debt choice for cash savings and offers contributions to the literature from three main perspectives. First, it studies the life-cycle of corporate cash savings in a representative emerging market and it documents a link to precautionary motives. Prior research has largely overlooked firms' sources of funds when investigating precautionary motives, thereby treating cash as a predetermined variable to the analysis. Second, it explores the issuance-saving link with respect to firm's decision to raise equity or debt. Prior work on cash holdings has so far studied only equity as a source of funds (e.g. McLean, 2011; Bolton et al., 2013). Finally, it sheds light on firm-level factors, such as internal governance, which limit the propensity of the firm to build externally-financed cash holdings. This helps explain why firms anticipating financial constraints do not build sufficient reserves in the first place to safeguard investment when external market conditions weaken.

The rest of the chapter is structured as follows. Section 2.2 positions the work in the literature. Section 2.3 presents the data. Section 2.4 presents the empirical findings on issuance, savings and investment. Section 2.5 presents results on the limits to the issuance-saving link. Finally, Section 2.6 concludes.

2.2 Related literature

One of the most important challenges the manager faces is to be able to finance the firm's investment projects at all times. Indeed, survey-based evidence reveals that finance managers around the world consider *financial flexibility* (broadly defined as the ability of the manager to finance firm's intertemporal investment) as a primary determinant of corporate financial decisions (e.g. Graham and Harvey, 2001; Bancel and Mittoo, 2004). These challenges are likely more acute during a financial crisis and particularly for firms more dependent on external finance and those with high external finance needs. For such firms, cash holdings are an important and often irreplaceable hedging instrument which allows them to smooth out investment declines during poor economic times (e.g. Duchin et al., 2010; Brown and Petersen, 2015).

Although the literature has promoted understanding of the value of holding cash in the presence of supply-side frictions, the link to precautionary (demand-side) motives has not been adequately explored. This is because cash has been treated in the literature either as a predetermined variable or as resulting from adjustments in financial policies at the margin (e.g. Duchin et al., 2010; Bliss et al., 2015) -- both of which are hardly supportive of precautionary motives. This work fills that gap in the literature by investigating to what extent firms issue outside finance in order to save proceeds as cash consistent with precautionary motives.

The starting point in our discussion is that firms with access to perfect capital markets should have little or no interest in accumulating cash, outside the need to meet their transaction needs. It is only when managers anticipate frictions in raising new capital or in hedging investment risks that they consider increasing firms' stock of cash. Here, the general consensus is that firms save cash out of internal cash flows. This is inspired by the pecking order theories of Myers (1984) and Myers and Majluf (1984). For example, studies which infer firms' financial constraints from the sensitivity of investment to cash-flows and the cash-flow sensitivity of cash are consistent with this view (e.g. Fazzari et al., 1988; Almeida et al., 2004).

However, more recent developments show that firms save cash out of issue proceeds. For example, Kim and Weisbach (2008) show that U.S. firms raise new equity and save proceeds as cash after initial public offerings (IPOs) and seasoned equity offerings (SEOs). In a similar vein, McLean (2011) finds that U.S. public firms increasingly save cash out of equity proceeds. By contrast, studies such as Greenwood (2005) and DeAngelo et al. (2010) examine cash saving from a market-timing perspective. They argue that firms can take advantage of overvalued stock to save issue proceeds as cash instead of using them for investment. Bolton et al. (2013) present a theoretical analysis that unites these different views. Their model suggests that firms may time the market to create a buffer through which they can support investment during a financial crisis.

This chapter expands the discussion in the literature mainly from two perspectives. First, it examines cash savings with respect to both equity and debt capital-raising. Here, theories on firms' issuance-saving sensitivities offer limited guidance. The work presented by Armenter and Hnatkovska (2012) and Eisfeldt and Muir (2016) explain the simultaneous demand for equity and cash. The former argues that firms facing high investment risk rely on equity as it allows them to suspend payments to shareholders in response to a negative shock. The latter argues that a stronger issuance-saving link is consistent with an aggregate lower cost of external finance. From another perspective, Chang and Song (2014) argue that firms with a post-issuance saving behavior may be at the top of the pecking order of financing decisions. That is, they may have low internal funds to meet their investment demand and low collateral values or information-asymmetry problems to pursue this through debt.

However, the issuance-saving link need not *a-priori* be confined to equity-financing. For example, debt proceeds of longer maturities may also support savings. This is because the firm can be left with cash proceeds for a longer period of time before repayment (including times of deteriorated credit conditions), as opposed to proceeds from short-term debt. This should be particularly important to firms with low credit quality, as they are likely to face acute refinancing risks and underinvestment problems when external market conditions weaken (e.g. Erel et al., 2012). Alternatively, issuing short-term debt is of little use for savings as the increase in cash is exactly offset by the required debt repayment (e.g. Acharya et al., 2012).

Another dimension of interest to this work are limitations to the issuance-saving link. Eisfeldt and Muir (2016) discuss the impact of floatation costs while Erel et al. (2012) focus on firms' credit quality. This work discusses additional firm-level factors which might limit the issuance-saving link, namely ownership dilution, agency problems in cash holding and affiliation to business groups.

Starting with ownership, corporate insiders face the risk of diluting control when the firm raises new equity. This risk is likely more pronounced in emerging market companies, as insiders value private benefits of control. From a different perspective, agency concerns in cash holding may also be relevant to the issuance-saving link. This is because cash is a strong candidate for being turned into private benefits, among other corporate assets (e.g. Harford et al., 2008). Hence, one could argue that firms with stronger forms of governance would be less likely to hold a large fraction of proceeds as cash subsequently to issuance. This may be explained by greater supervision on firm management as well as by a lower inclination to hoard cash because governance can by itself alleviate financial constraints.

Finally, firm affiliation to business groups may also be negatively related to cash hoarding. This is because groups' internal capital markets can play a buffering role similar to cash holdings (e.g. Gopalan et al., 2007). Therefore, cash proceeds should be more pronounced in stand-alone firms than in group-affiliated firms. Overall, this chapter examines the issuance-saving link from different theoretical angles to offer a more comprehensive view of precautionary cash holdings in emerging markets. Right next, we present the data used in the empirical analysis.

2.3 Data

This study uses detailed financial information of Indian firms from the *Prowess* database. Prowess is compiled by the Center for Monitoring the Indian Economy (CMIE) and is the primary source of data used by most prior firm-level research on India (e.g. Khanna and Palepu, 2000; Gopalan et al., 2007).

Sample firms are firms in the private sector that have publicly listed shares on the country's largest stock exchange (Bombay Stock Exchange) and belong to the manufacturing sectors. Out of all manufacturing firms covered by Prowess, we exclude firms in which the controlling shareholder ('promoter') is the government or foreign entities. We also exclude firms with missing values on cash holdings, which is the main variable of interest. The final sample consists of 1,858 public firms, which expand over 10,000 firm-year observations during the period 2001-2010.

We collect information on equity and debt raising activities from firms' cash-flow statements. The former represent new primary issues that increase the number of shares outstanding and lead to capital inflows to the firm. We discard issues which account for sales of existing shares by corporate insiders (secondary offerings), as they do not entail a cash inflow to the firm. Therefore, new equity offerings are all share issuances that add new capital to the firm, net of any redemption or share buybacks taking place during the year.[12] Similarly, we collect information on firms' net debt issues, i.e. cash flows due to proceeds from long-term borrowings, net of any repayments taking place during the year. We focus on long-term borrowings because, as explained above, borrowings of short maturities are not suited to serve a precautionary motive (e.g. Acharya et al., 2012).

Panel A of Table 2.1 summarizes the information on external finance activities of sample firms. Figures reported show that the proportion of sample firms which raised new equity increased from about 10% at the start of the study period to almost 25% right before the onset of the 2008-9 global financial crisis. During that period, net equity proceeds amounted to 2% of firms' assets on average. Turning to debt issues, one out of three sample firms increased its long-term debt in the period before the crisis. The respective amounts were almost on par with those of equity issue proceeds.

However, the period which follows the onset of the global financial crisis coincides with shifts in firms' capital-raising activities. In particular, average levels of new debt proceeds increased while average levels of new equity proceeds declined during fiscal years 2007/8-2008/9, with their difference reaching a decade-long high. The data suggest that Indian public firms were increasingly raising outside funding in the form of equity in the pre-crisis period. However, they scaled back from this financing behavior following the crisis. In a period of increased uncertainty in external market conditions and sharp fall in company valuations, firms continued to obtain outside funding, yet the source of this funding may have shifted from equity to debt (See Figures 2.1 and 2.2).

Panel B compares financial and ownership characteristics of firms in years in which they raised new external finance to years in which no external finance took place. Results from univariate comparisons are presented separately for capital-raising in the form of equity and debt. Relative to firm-years with no equity issuance, firms in issue-years were larger, with higher market-to-book ratios and past-year stock returns. In addition, firms raised via equity offerings amounts which were significant compared to their net worth. In particular,

[12] Prowess provides detailed information on the date, amount, type (e.g. rights issues, private placements), number of additional shares and change in paid-up capital for firm issue-years.

controlling shareholders (promoters) would see their ownership decline by more than 5% in an issue year on average. This implies that raising new equity capital may have been accompanied by substantial ownership dilution -- a likely concern for promoters in firms with concentrated ownership structures.

On the other hand, a firm issuing new equity would increase its cash-to-asset ratios by 1 percentage point on the year of issue. By contrast, no significant changes in cash holdings are observed for firms increasing their debt. Although preliminary at this stage, univariate analysis in this section supports the view that increases in cash holdings may have been more closely related to increases in equity than increases in debt before the crisis. In the section below, we test this argument using multivariate analysis.

2.4 Empirical findings

2.4.1 Saving motives in raising new equity and debt

We start this section by exploring the *ex-ante* financial characteristics of firms involved with raising new capital in the form of equity and debt. The objective here is to draw some inferences from firms' financial attributes before issuance about their inclination to save issue proceeds as cash constistent with precautionary motives. To do so, we collect information about both the type and structure of each fund-raising event taking place during the sample period.

In our proposed models, we explain the external financing decision as a function of a set of firm-level financial variables proposed by the literature (e.g. Pagano et al., 1998; Chemmanur et al., 2010; Gopalan and Gormley, 2013). This includes firms' size, age and cash-flow performance as well as measures for growth opportunities (market-to-book ratios) and leverage. Moreover, it includes firms' past-year and following-year market-adjusted stock returns to account for market-timing considerations in cash-hoarding (e.g. DeAngelo et al., 2010).[13]

[13] We measure abnormal stock returns as raw returns minus contemporaneous returns on a value-weighted market index which we build using as weights firms' values for market capitalization.

In addition, we control for cross-sectional differences in firms' ownership structure. Specifically, we include a dummy variable that identifies firms with affiliation to business groups as well as a variable that measures the fraction of ownership held by promoters. Finally, our model includes a set of country-level variables to control for common time-varying macroeconomic conditions. This includes the country's real GDP growth as well as the size of the domestic stock market and that of credit markets relative to GDP. Previous studies have used these measures to capture changes in external market conditions (e.g. Rajan and Zingales, 1998). Specifically, our proposed model specification is the following.

$$Issue_{it} = \boldsymbol{X}'_{it-1}\beta + \varepsilon_{it} \tag{2.1}$$

The dependent variable *Issue* is derived from the cash flow statements of firm *i* and refers to net proceeds from equity or debt issues in time *t*. *X* is a vector of determinants described above. Firm-level financial variables enter with a lag operator to reduce the potential simultaneity bias with the external finance decision. The model is estimated via a Tobit regression in which we acknowledge that not all sample firms raise new capital of a particular type in a given year. In some specifications, we also perform multinomial regressions to study the propensity of the firm to choose between different types of equity and debt. Results of these tests are presented in Table 2.2.

Findings in the first column show that firms with a greater proportion of new equity issuances were larger young firms with limited sources of inside capital such as cash holdings and operating cash-flows. These firms operated in industries with good growth opportunities as suggested by the positive coefficient of the industry market-to-book ratio. Combined, this evidence suggests that firms raising new equity had substantial investment opportunities relative to internal cash-flows. Prior research associates these firms with severe credit frictions, pertinent to information asymmetry problems and low collateral values (e.g. Brown and Petersen, 2011).

In addition, equity issuance was negatively related to ownership held by firms' promoters. This evidence supports the argument raised in the previous section that the risk of diluting control was likely a concern in firms issuing new equity. On the other hand, results from the country-level variables show that equity issuance was taking place during favourable conditions in the stock market and the overall economy. This evidence reveals that firms were likely to raise new equity when times were good and consequently the cost of external finance relatively low. However, given that equity issuance was positively related to future market-adjusted stock returns, these results are not suggestive of market-timing in issuance (e.g. DeAngelo et al., 2010).

Evidence from column (2) shows that most variables related to equity financing were also significant in debt-linked activities. Indeed, firms reporting increases in net debt proceeds were large firms which belonged to industries with good growth opportunities. However, in contrast to their equity-focused peers, they would benefit from stronger profitability and also belong to high-leveraged industries. The negative relation to cash holding is consistent with pecking order theories according to which, firms prefer internal to external capital, and debt to equity if needed (e.g. Myers and Majluf, 1984). An alternative explanation is that firms may increase long-term debt to enhance internal liquidity. This motive should be more pronounced in firms in which managers are worried that firms' outside funding will be limited or too costly in adverse future economic times.

The rest of the columns elaborate on saving motives by studying the propensity of issuing firms to choose between different types of equity and debt. Columns (3) and (4) explore the decision to raise new equity from public sources and private sources. Evidence from a multinomial logit model in which no equity is the reference case, shows that lower cash balances increased the likelihood of raising equity from public sources but not from private sources. This evidence gives rise to a positive relation between public equity offerings and post-issuance savings and is consistent with the work of Kim and Weisbach (2008) on cash hoarding in the aftermath IPOs and SEOs.

Next, we examine the relation between debt maturity and saving motives. We start by classifying firm-year observations with and without investment-grade ratings.[14] The distinction is motivated by past studies which show that a borrower's credit quality may significantly affect its ability to raise new capital during poor economic times (e.g. Erel et

[14] We denote as high credit quality firms those with a rating status of 'highest' or 'adequate' safety by all credit rating agencies covered in Prowess (the list includes *Fitch* Ratings agency and domestic agencies).

al., 2012). We argue that it might also affect the precautionary demand for cash *ex-ante*. Evidence from columns (5) and (6) shows that an increase in debt was associated with previously lower levels of cash, but this holds only among non-investment grade firms. Similarly to equity-dependent firms, these firms are likely to face credit frictions and therefore jointly manage their external finance and savings decisions to secure capital for future investment.

Finally, the remaining columns examine saving motives with respect to the currency denomination of debt proceeds. Our prior expectation is that foreign-currency debt should be closely related to cash hoarding (especially foreign-currency savings). This is because firms with foreign borrowings would take an interest to shield themselves against changes in exchange rates that increase their interest costs and debt burden. Contrary to this expectation, we find that firms with *already* large cash holdings were likely to increase their proportions of foreign-currency debt. This evidence is reported for firms with low external finance needs, as suggested by the Rajan and Zingales (1998) external finance dependence measure (EFD).[15,16] Given that these firms are less likely to be associated with a precautionary demand for cash, we conclude from this evidence that issuance in foreign currency may not associate with precautionary-saving motives of the average issuing firm. Instead, it may be consistent with alternative explanations proposed by the literature, namely that firms can take advantage of favourable conditions in international debt markets to store foreign-denominated capital in their balance sheets (e.g. Bruno and Shin, 2015).

In summary, our empirical analysis in this section reveals that firms with low internal funds to meet investment demand were raising outside funding in the form of equity -- primarily from public sources. Firms with debt issues of longer maturity but low credit quality were also associated with previously low levels of cash holdings. Given that both types of firms are likely to face potentially severe finance frictions when external market conditions weaken, one might expect that capital raising may to an extent be driven by the need to

[15] However, the difference in the coefficients of the cash holding variable is not statistically significant at conventional levels (0.116).

[16] The Rajan and Zingales (1998) measure of external finance dependence (EFD) is calculated as (Capex-Cashflow)/Capex.

enhance internal liquidity. The section below tests more explicitly this argument by exploring sources of funds conducive to increases in firms' cash holdings.

2.4.2 Issue proceeds and cash savings

What is the contribution of issue proceeds to cash savings? How does this differ when firms raise outside equity and debt? How relevant are external market conditions? This section addresses these questions with the aim of providing a better understanding of external finance decisions of emerging market companies and their implications on cash savings.

In our proposed model, we regress changes in firms' cash holdings on net inflows from equity issuance and debt issuance, after controlling for a set of firm-level financial characteristics as well as firm and year fixed effects.

$$\Delta Cash_{it} = \gamma_0 + \gamma_1 Equity\ proceeds_{it} + \gamma_2 Debt\ proceeds_{it} + \delta Z_{it} + \alpha_i + \theta_t + \varepsilon_{it} \qquad (2.2)$$

In the model, the dependent variable is the annual change in cash holdings scaled by firm's assets net of cash in the previous year. Consistent with the literature, this measure captures developments in cash holdings based on firm's ability to exploit sources of funds and generate profits through its assets-in-place (e.g. Opler et al., 1999; Dittmar et al., 2007).

The right-hand-side variables include issue proceeds separately from equity and debt activities, as well as firm's total assets, capital expenditures, operating cash-flows, growth of sales, and leverage. Given that both cash savings and sources of funds are normalized by firm's net assets, we can interpret their coefficients as the portion of annual proceeds that increases the stock of cash on the year of issue. Moreover, to control for the potential endogeneity in firm's issuance choice, we include among the regressors the inverse Mills ratio from a first-stage regression which explains issuance (equity and debt) as a function of firm-level financial characteristics. Details of these tests are presented in the Appendix (Annex 2.B).

Column (1) of Table 2.3 presents results from the baseline specification above. It shows that 40 cents out of each Indian Rupee (INR) of net equity proceeds and 7 cents out of each

Indian Rupee (INR) of net debt proceeds ended up increasing the stock of cash on the year of issue. This difference is statistically significant at 1% (p-value = 0.000), which implies that outside equity would contribute to cash holdings more than outside debt.

Understandably, proceeds saved as cash on the year of issue are not necessarily supportive of precautionary motives. Indeed, firms may temporarily store proceeds as cash before employing them on scheduled investments (e.g. Brown and Floros, 2011). While a mechanically positive relation between issue proceeds and cash savings is to some extent expected, the focus here is on differences in savings which arise from the *source* of funds. For this purpose, we create interaction terms of the external finance variables with a dummy variable taking values one for firms which raised capital above their current finance needs. We define proceeds as 'excessive' if they are greater than the sum of firm's capital expenditures realized within three years after issuance, i.e. $finance_{t=0} > \sum_{t=0}^{t=2} Capex_{it}$, where $finance = \{Equity, Debt\}$. We create dummy variables separately for firms which raised excessive equity (*More Equity*) and firms which raised excessive debt (*More Debt*).

The idea here is that firms with precautionary-saving needs may raise new capital in excess of current financing needs. By creating dummies separately for equity and debt, we aim to estimate the degree to which issue proceeds contribute to cash savings and how this varies with the source of funds.

Results in column (2) show that a firm which raised new equity kept as cash around 30% of proceeds on the year of issue. A firm which raised equity more than currently needed saved almost double that amount. By contrast, debt proceeds were not likely to contribute much to cash savings. These findings can be explained by a relatively larger inclination of firms increasing debt to invest proceeds in non-liquid assets -- possibly as a means to generating sufficient income to repay that debt. This discrepancy in results between equity and debt suggests that firms may treat outside equity as less costly to build savings than the alternative of raising outside debt.

To explore heterogeneity within firms with access to outside debt, we repeat these tests after creating subsamples of firms based on their refinancing risks. Column (3) presents results for firms with leverage (debt-to-asset ratios) above the industry median and a proportion of long-term debt below the industry median (*High refinancing risk*). Similarly, column (4) presents results for firms with leverage above the industry median and a proportion of long-term debt above the industry median (*Low refinancing risk*). The literature suggests that the former group of companies are associated with more severe refinancing risks and hence may keep proceeds as cash as a precaution (e.g. Harford et al., 2014). Indeed, evidence shows that firms facing higher refinancing risks were more likely to save proceeds as cash. However, they were likely to resort to outside equity -- rather than debt -- to enhance internal liquidity. This finding suggests that even firms with access to outside debt may choose equity for building cash holdings.

As a final test, we examine whether firms' issuance-saving behavior changed in the aftermath of the global financial crisis. Column (5) presents results for the period 2007/8-2008/9. Evidence shows that firms which raised new equity during crisis saved almost half of issue proceeds as cash in their balance sheets. This is quantitatively similar to firms' pre-crisis issuance-saving behaviour (column 1). However, during crisis there is no statistically significant difference in saving for firms which raised additional financial resources based on contamporaneous financing needs. This discrepancy in results with the pre-crisis period suggests that firms may have found it more costly to build cash reserves out of equity proceeds during crisis. Note that data statistics show that both levels of equity proceeds and the fraction of firms raising new equity declined during the crisis (See Panel A, Table 2.1).

On the other hand, firms which raised new debt were more likely to save proceeds as cash during crisis. Again, results are quantitatively similar to those in pre-crisis (see column 1), but appear only when firms raised capital substantial to their investment-financing needs. These findings suggest that the crisis period may have shifted the relative costs of raising new capital from debt to equity. This shift may have had implications on sources of funds contributing to firms' cash holdings. These results are consistent with the work of Erel et al. (2012) who show that supply-side effects were likely to induce firms in bad times to store debt proceeds as cash. An alternative explanation is that a crisis period may coincide with changes in firm fundamentals. As returns on investment fall, firms are inclined to spend proceeds on savings rather than on capital investment (e.g. Kim et al., 1998).

In sum, evidence in this section shows that raising new equity is a strong predictor of increasing cash holdings in sample firms. Although debt proceeds can also contribute positively to cash holdings, they are less likely to represent hedging against unfavourable market conditions. An implication of these findings is that cash holdings from equity and debt may serve to hedge against different types of frictions. That is, equity-dependent firms may hoard cash to weather adverse external capital market conditions, while debt-focused firms may hoard cash to weather firm-specific cash-flow risks which jeopardize debt repayments. These findings are consistent with recent developments in the literature on financial constraints, and highlight the debt vs. equity choice for funds as an important element of firms' hedging strategies (e.g. Hoberg and Maksimovic, 2015).

2.4.3 Cash holdings as a hedging instrument during crisis

An implication of results so far is that equity-focused firms have inherent characteristics which make them prone to reducing investment in the event of an external finance shock. On the other hand, they have greater flexibility than their debt-focused counterparts to build cash holdings from external sources of funds with a view to smoothing out this shock.

This section studies whether cash holdings were significantly related to firm investment in the aftermath of the global financial crisis. Following the literature, we consider the crisis as an external finance shock to the individual firm's ability to sustain investment and we adopt a difference-in-differences model to estimate the influence of cash holdings on firm investment (e.g. Duchin et al., 2010; Brown and Petersen, 2015).

$$Capex_{it} = \delta_0 + \delta_1 Crisis_t + \delta_2 (Cash\, reserves_i^* \times Crisis_t) + \beta \Psi_{it} + \alpha_i + \varepsilon_{it} \qquad (2.3)$$

In the model, the dependent variable is firm capital investment (*Capex*). *Crisis* is an indicator taking values one for fiscal years 2007/8-2008/9 and zero for the two years before. *Cash reserves* are firms' levels of cash holdings measured once per firm before the outburst of the 2008-9 global financial crisis. For validation purposes, we attempt several specifications in which we measure cash holdings one to four years before the crisis. We use pre-crisis values to mitigate problems of simultaneity bias with post-crisis corporate outcomes and capture better firms' precautionary motives in holding cash. The coefficient of the interaction term is of interest here as it captures the importance of cash for firm investment during crisis. We expect a *positive* coefficient for firms which used their cash holdings to support investment during crisis.

The model controls for firms' operating cash flows (*Cash-fow*) to account for changes in firms' profitability that likely affected their ability to finance investment. Moreover, it includes firms' values for the market-to-book ratio (*M2B*) to control for cross-sectional differences in firms' growth opportunities.

Column (1) of Table 2.4 presents results from testing equation (2.3) above, in which cash holdings are measured once per firm one year before the crisis. Results show that firm investment as a fraction of assets declined during crisis and this decline was substantially larger for firms with low cash reserves. Specifically, a firm with no cash reserves would reduce investment by 1.1 percentage point during crisis while a firm with 14.9% (=0.011/0.074) of assets in the form of cash would completely eliminate the decline. These results provide support to previous studies which highlight the role of cash as a liquidity buffer during the financial crisis (e.g. Duchin et al., 2010).

Columns (2), (3) and (4) report results in which cash holdings are measured two, three and four years before the crisis, respectively. Contrary to results above, the interaction terms with the crisis dummy are not significantly related to firm investment. This evidence weakens the argument that firms' levels of cash holdings in good times are associated with precautionary motives. To elaborate on the issuance-saving link, we examine whether firms' external funds saved as cash -- instead of levels of total cash -- related to crisis-period firm investment. For this purpose, we replace levels of total cash holdings (*Cash Reserves*) with the incremental proceeds the firm raised from the market above its current finance needs 4 years prior to the crisis (i.e. well before the crisis erupted). The increment is computed, as discussed in the previous section separately for issues of equity and debt, as: $finance_{t=0} - \sum_{t=0}^{t=2} Capex_{it}$, where $finance = \{Equity, Debt\}$.

Evidence in column (5) shows that firms' proceeds from equity issuance before the crisis were significantly related to firm investment after the crisis. In light of the issuance-saving link presented in Section 2.4.2, this evidence reveals that firms raising new equity in good times supported investment in bad times through the cash-holding channel. These findings lend empirical support to predictions of theoretical studies on precautionary motives in the issuance-savings link (e.g. Bolton et al., 2013; Eisfeldt and Muir, 2016).

Not surprisingly, firms' proceeds from debt of longer maturities related positively to firm investment (column 6). When examined in conjuction with proceeds from equity, the coefficients of the two sources of funds are not statistically different (column 7). This evidence suggests that equity-dependent firms could bridge the financing gap during crisis by building proceeds as cash in good times and sustain the level of investment which proceeds from longer maturity debt would allow.

2.5 Limits to the issuance-saving link

Evidence in the previous section suggests that firms raising substantial equity in good times would use part of proceeds as a buffer to mitigate investment declines in bad times. This section explores firm-level factors which might limit firms' incentives to tap equity markets in good times and thereby limit the issuance-saving link.

It has already been noted from the description of the data that ownership dilution may have been an important concern in the decision to issue equity. Specifically, firms' promoters would see their ownership in the firm decline by more than 5% on the year of issue. Agency concerns, floatation costs and affiliation to business groups are additional factors which are discussed below and can potentially limit the issuance-saving link.

To examine how these factors interact with firms' savings behavior after issuance, we estimate equations which track down the use of proceeds over time. In particular, we adopt the model specification proposed by Kim and Weisbach (2008) and used by others (e.g. Erel et al., 2012). The model allows new capital from equity proceeds, debt proceeds and other sources of funds to enter separately in a regression that explains cash savings, while controlling for cross-sectional differences in firms' size before the year of issue. Specifically, the model specification in its general form is the following.

$$Y=\alpha+\beta_1 \ln\left(\frac{\text{Equity proceeds}}{\text{Assets}_0}+1\right)+\beta_2 \ln\left(\frac{\text{Debt proceeds}}{\text{Assets}_0}+1\right)+\beta_3 \ln\left(\frac{\text{Other proceeds}}{\text{Assets}_0}+1\right)+\beta_4 \ln(Assets_0)+\varepsilon \quad (2.4)$$

The dependent variable is the cumulative change in cash holdings following the year of issue (equity or debt) scaled by the value of firms' assets before issuance $\left(\frac{V_t-V_0}{Assets_0}\right)$. V_0 is firm's cash holdings at the year-end prior to issuance and V_t is the accumulated cash holdings $t = 1, 2, 3$ fiscal years subsequently to the issue year. We follow the literature in using a logarithmic transformation of the form $Y=\ln\left[\left(\frac{V_t-V_0}{Assets_0}\right)+1\right]$ to tackle the problem of 'zero' variables ($V_t=V_0$) and smooth out the impact of outliers (e.g. Kim and Weisbach, 2008). Indeed, almost 80% of observations for changes in cash holdings appear with zero values when developments in cash holdings follow equity issues and 74% of observations when developments in cash holdings follow debt issues. These figures are consistent with the proportion of firms which increased net equity or debt during the period of study (See Table 2.1, Panel A). We consider the proportion of 'zeros' large enough to justify the use of log transformation in the specification. However, given that changes in cash holdings appear within the range (-0.35,+0.35), we use two alternative specifications for testing equation (2.5):

i) $Y=\ln\left[\left(\frac{V_t-V_0}{Assets_0}\right)+1\right]$, which tackles the large fraction of 'zeros', and replaces negative values with zero values to match positive contributions from net sources of funds (equity and debt), and;

ii) $Y=\left(\frac{V_t-V_0}{Assets_0}\right)+1$ which shifts the distribution so that all issuing firms reporting non-zero changes in cash holdings appear with positive values around 1.

These tests yield findings which are not sensitive to the choice of the model specification.

Models (1), (2) and (3) of Panel A1 in Table 2.5 examine changes in cash holdings one, two and three years after equity issuance, respectively. Models with indication (a) follow the baseline specification in equation (2.4). Models with indication (b) introduce heterogeneity with respect to the type of equity class (public or private). They include an interaction term with a dummy variable identifying equity from non-private sources

(*Public*). Models with indication (c) introduce a further distinction with respect to the frequency of issuance. They include an interaction term with a dummy variable which identifies firms which issued new equity more than two times over the period of study (*Back2Back*).

Results from Panel A1 show a positive contribution of equity proceeds on cash holdings over time (following mode (ii) presented above). This is robust to controlling for other sources of funds and firms' initial size and is in line with a persistent savings behavior. Consistent with results in Table 2.2, this saving behavior was more pronounced when funds were raised from public sources and when issuance was infrequent. The latter finding implies that fixed issuance costs were likely to limit firms' externally-financed cash holdings. As a result, firms would engage with large and infrequent capital-raising to build a liquidity buffer. This can help explain the large drawdown in insiders' ownership (around 5%) following equity issues reported in summary statistics (See Table 2.1). Importantly, these findings are not sensitive to the model specification used, as we find similar results when the dependent variable is log-transformed (Panel A2 of Table 2.5).

Panel B1 presents results on savings in the aftermath of debt-linked activities. Contrary to results on equity issues, results from studying debt show that proceeds were weakly related to cash savings over time. These findings are robust to using a log-transformed dependent variable (See Panel B2). In addition, the post-issuance savings behavior was not statistically different for low credit quality firms, i.e. those with non-investment credit ratings. If anything, these firms exhibited a lower propensity to save cash from operating cash-flows. Putting these findings together reveals that proceeds from equity rather than proceeds from debt were used by issuing firms to build cash holdings over time. This can be explained on the one hand by the inherent attributes of equity-dependent firms (e.g. larger information asymmetries) and on the other hand by the relatively greater flexibility that equity allows to the issuing firm to store proceeds in the form of idle cash.

2.5.1 Internal governance and the issuance-saving link

This section explores the role of firm's internal governance in the propensity to save cash out of issue proceeds. It is well-established in the literature that in weakly-governed firms, cash holdings can be expropriated or used in inefficient projects at the expense of outside investors (e.g. Harford et al., 2008). In countries with less developed financial and legal institutions, corporate insiders can hoard cash with few concerns that they may be challenged by minority (outside) shareholders (e.g. Dittmar et al., 2003). Hence, firms with stronger forms of internal governance are less likely to hold proceeds as cash subsequently to issuance activities. This can be explained by more stringent monitoring from internal governance and/or by a lower inclination to hoard cash because good governance can by itself alleviate financial constraints. This argument gives rise to a trade-off in holding cash under weak governance between a higher risk of expropriation and the benefit of minimizing the need for costly external funding.

We empirically explore these arguments by introducing heterogeneity across firms with respect to firms' internal governance. In particular, we use the level of board independence and ownership held by (non-controlling) foreign institutional investors. Both measures have been proposed by prior research as important for monitoring and assessing firm management (e.g. Edmans, 2014; McCahery et al., 2016). Here, they are examined with respect to firms' decision to build cash holdings through new issue proceeds. Specifically, we create a dummy variable which takes values one for firm-years which pass the 50% threshold in board independency (*Board*), and zero otherwise. Similarly, we create a dummy variable which takes values one if the firm became foreign-invested during the period of study (*Foreign*).

These measures are included among the regressors proposed in equation (2.1). Panel A of Table 2.6 shows that board independence was positively correlated with new equity issues while foreign institutional ownership was negatively correlated with new equity issues. Given the discrepancy in results between the two measures, column (3) examines them together with their interaction term. Results remain significant only for the influence of the board on new equity issues. Hence, firms with stronger forms of internal governance were more likely to raise new equity than firms with weaker forms of firm-level governance. This suggests that corporate governance was likely an important determinant of firms' equity issuance behavior, even after controlling for firm-level financial characteristics. By contrast, internal governance had a limited role in explaining capital raising when the source of funds was outside debt. This evidence suggests that the *ex-post* monitoring by firms' creditors can mitigate the *ex-ante* influence of corporate governance in issuance.

Having documented a link between internal governance and issuance, we next explore the role of governance in firms' management of cash proceeds. Panel B presents results of equation (2.4) separately for firms which passed the 50% independency threshold (stronger forms of internal governance) and for those that failed (weaker forms of internal governance). Results show that firms with good governance were not likely to store proceeds as cash in the long-term. In fact, one Indian Rupee (INR) of proceeds was likely to be spent on physical assets, rather than liquid assets, three years after issuance (t=3). The difference in the coefficients reflecting the spending between liquid and physical assets is statistically significant, as reported from tests at the bottom of Panel B in Table 2.6.

By contrast, firms with weaker forms of governance were likely to split their proceeds between savings and investment, with the difference in the respective coefficients being statistically not significant at conventional levels (See p-values at the bottom of Panel B). This evidence suggests that although good governance can increase confidence that cash will not be wasted by firms' managers (e.g. Gao et al., 2013), it was not associated positively with cash hoarding in our sample firms. On the contrary, firms storing proceeds as cash were firms with weaker forms of internal governance. These firms may hoard cash when times are good to manage financial constraints when times are bad. These constraints are likely exacerbated by firms' agency and information asymmetry problems. Putting these findings together, this section supports the view that firms with weaker forms of internal governance were less likely to raise new equity capital -- but conditional on raising capital, they were likely to store some proceeds as cash, possibly to alleviate future financial constraints. This evidence is indicative of a strong link between agency and precautionary motives in cash holding not explored adequately by prior studies.

2.5.2 Group affiliation and the issuance-saving link

Finally, this section explores the role of group affiliation in firm's propensity to save cash out of issue proceeds. Group affiliation shares some of the merits and drawbacks of cash holdings. On the one hand, firms in business groups may benefit from access to groups' internal capital markets which can minimize the need to hoard cash. For example, the work by Gopalan et al. (2007) shows that groups can extend monetary support to financially-troubled affiliates in the form of intra-group loans. Similarly, Duchin (2010) shows that internal capital markets may reduce significantly the amount of cash that firms hold because affiliates are diversified in their investment opportunities. On the other hand, insiders in business groups may use internal capital markets to expropriate cash holdings. For example, Bertrand et al. (2002) document that business groups in India tunnel cash-flows to firms in which the controlling shareholder has higher cash-flow rights. In a similar vein, Tong (2008) shows that firm diversification is conducive to cash-related agency problems.

To empirically explore how group affiliation may interfere with firms' saving behavior after issuance, we repeat the test in equation (2.4) separately for group-affiliated firms and stand-alone firms. Evidence in Table 2.7 shows that stand-alone firms were more likely to save cash out of issue proceeds than their peers in business groups. The difference in the respective coefficients between group-firms and stand-alones is statistically significant, as reported from tests at the bottom of Table 2.7. These results were stronger when capital was raised from public sources consistent with our previous findings. Hence, the strong issuance-savings link documented in our findings so far was likely more pronounced in firms with no or limited access to groups' internal capital markets. This evidence stands as a further supporting evidence in favour of precautionary motives in cash holdings.

2.6 Conclusion

Recent studies show that U.S. public firms build their cash holdings out of new equity proceeds, in sharp contrast to predictions from standard pecking order theories (e.g. Myers and Majluf 1984). This chapter extends the literature by exploring firms' post-issuance saving behavior with respect to their decision to raise new equity or debt and by identifying implications of the debt vs. equity choice on firm investment across states of the world.

Using financial information from Indian publicly-listed firms, we document that the issuance-saving link: i) is not limited to U.S. firms but may expand to firms in emerging markets, ii) is not limited to equity issuance but may relate to debt issuance, depending on external market conditions, and iii) is subject to limits at the firm-level which renders cash proceeds from issuance insufficient in safeguarding investment alone.

In particular, findings from this work show that firms with low internal funds to meet investment demand were likely to raise new equity and simultaneously save proceeds as cash. This post-issuance saving behavior was more pronounced when firms raised additional financial resources based on their current finance needs -- i.e. without having to incur a drop in the levels of contemporaneous investment. These firms would use their cash proceeds to support firm investment in the aftermath of the 2008-9 global financial crisis, thus bridging the funding gap when external market conditions weakened. By contrast, debt proceeds were weakly related to firms' cash holdings. This likely reflects the relatively greater flexibility provided by equity to the issuing firm to store proceeds as idle cash, which is a distinctive feature of the equity vs. debt choice for cash savings.

Overall, this work suggests that precautionary-saving motives can be an integral part of firms' equity-financing decisions in emerging markets. This results not only from greater finance frictions faced by equity-dependent firms (e.g. due to larger information asymmetry problems) but also from the greater flexibility that equity (over debt) itself provides to the issuing firm to store proceeds as cash in the long-term. These results cast some doubt on prior research which highlights overwhelmingly agency problems in cash holdings in emerging and developing markets. Future work could shed more light on the role of precautionary cash holdings in different institutional contexts beyond our country evidence.

In addition, our work examines the precautionary motive with respect to capital investment only. This is because only few firms in our sample were R&D-intensive. However, past studies propose that cash holdings can also work as a buffer against declines in research spending (e.g. Brown and Petersen, 2011). Therefore, it would be interesting to investigate whether proceeds from issuance can also serve a precautionary role in other forms of firm spending. We consider these as well as other related topics in cash holdings as fruitful for future research.

Table of Figures

Figure 2.1 Global volatility and the stock market performance in India

This Figure depicts the performance of India's *Sensex* market index compared to the Volatility Index (*VIX*), which is a proxy for global volatility conditions used popularly in the financial press. *Sensex* is a value-weighted index (100=1978/9) which tracks the performance of the 30 largest firms (e.g. Infosys, Tata Motors) listed on India's Bombay Stock Exchange (BSE). The shaded area corresponds to the downturn in Indian stock markets during the 2008-9 global financial crisis, in which the *Sensex* index dropped by more than 50% from its pre-crisis record-high levels.

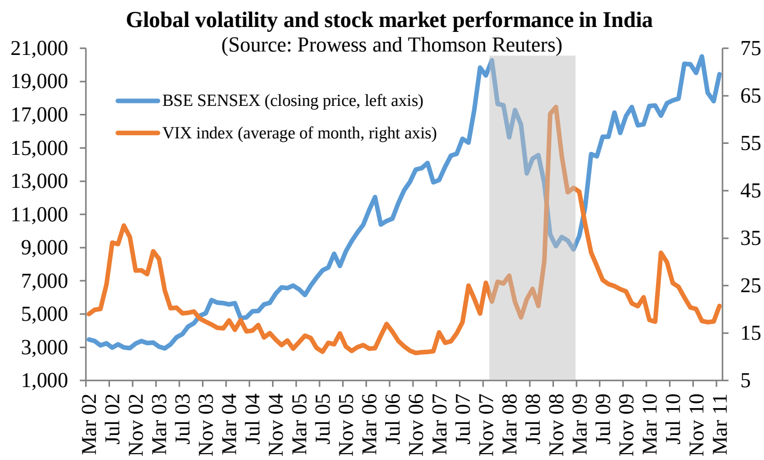

Figure 2.2 Households' investment in equity and debt of Indian corporates

This Figure displays private sector investment in shares and debentures of Indian corporates during the period of study. The shaded area displays changes in net financial assets of households as a percentage of the country's GDP. Monthly figures reported are interpolated from annual data published by the Reserve Bank of India.

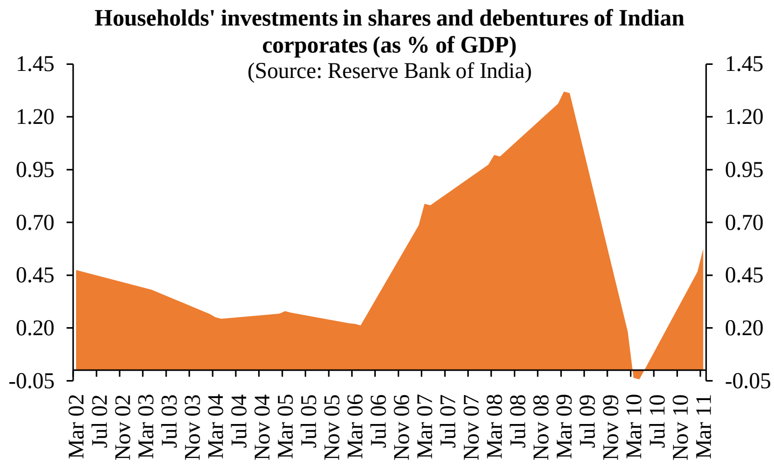

Table of Results

Table 2.1 Sample distribution and main variables' statistics

This Table presents information on capital-raising activities of Indian listed manufacturing firms during the fiscal years 2001/2-10/11 and related shifts in key financial characteristics. Panel A presents the yearly distribution of net new equity and debt issues, as provided from firms' cash-flow statements in Prowess. Figures reported are the percentage of firms engaged with new issues in a year, the median yearly proceeds (in constant 2005 Indian Rupees), and the mean proceeds as a ratio to past-year assets. Panel B compares financial and ownership characteristics of issuing firms between issue-years and non-issue years. T-tests of mean differences are provided separately for equity and debt issues, with ***, **, * indicating statistical significance at 1%, 5% and 10% respectively. Definitions of all variables are provided in the Appendix (Annex 2.A).

Panel A. Sample distribution

	Net equity issues			*Net debt issues*		
	% Firms	% Total Assets	Proceeds (INR, mn.)	% Firms	% Total Assets	Proceeds (INR, mn.)
2001/2	10.5		28.0	32.7		31.4
2002/3	9.8	1.72	20.0	32.5	4.26	27.7
2003/4	12.8	1.72	23.6	34.8	4.49	28.1
2004/5	12.9	1.91	41.1	30.2	4.94	38.8
2005/6	22.7	2.19	79.2	29.1	5.45	65.2
2006/7	23.4	2.11	66.1	31.2	5.23	69.6
2007/8	22.0	2.01	65.7	28.7	5.22	70.3
2008/9	16.1	1.77	40.6	24.7	4.96	87.5
2009/10	18.1	1.85	61.3	22.9	4.57	62.6
2010/11	19.9	1.73	40.5	21.6	4.62	60.7
Average	16.8	1.89	46.6	28.8	4.9	54.2

Panel B. Mean comparison tests

Firm characteristics	*Equity issues*			*Debt issues*		
	Issue years	Non-issue years	Diff.	Issue years	Non-issue years	Diff.
Total Assets	7.747	6.653	1.094***	7.224	6.697	0.527***
Cash	0.053	0.043	0.010***	0.044	0.044	0.000
Market/Book ratio (M2B)	1.209	1.092	0.117***	1.115	1.116	-0.001
Leverage	0.242	0.206	0.036***	0.259	0.194	0.065***
Cash-flow	0.065	0.077	-0.012***	0.069	0.078	-0.009***
Stock returns	0.397	0.117	0.280***	0.307	0.116	0.191**
Promoters (%)	46.08	51.45	-5.37***	50.77	50.33	0.44
Group	0.441	0.397	0.046***	0.419	0.400	0.019**
Board	0.295	0.254	0.041***	0.276	0.255	0.021**
Foreign	0.379	0.395	-0.015	0.394	0.391	0.003

Table 2.2 Saving motives in raising outside capital

This Table examines the *ex-ante* financial characteristics of sample firms involved with capital-raising in the form of equity and debt during the period 2001-7 (See equation (2.1)). Columns (1) and (2) report results from Tobit regressions on the concentration of net equity/debt proceeds in total proceeds reported by firms in cash-flow statements. Columns (3) and (4) present results from a multinomial logit model of choice between equity from public and private sources which uses no equity as the reference case. Columns (5) and (6) present results from Tobit models on the propensity to raise debt with longer maturities for subsamples of non-investment grade firms and investment grade firms, respectively. Columns (7) and (8) present results from Tobit models on the proportion of foreign-currency debt for subsamples of firms with high and low external finance needs, respectively. EFD is the Rajan and Zingales (1998) measure of external finance dependence, calculated as (Capex-Cashflow)/Capex. Descriptions of all variables are provided in the Appendix (Annex 2.A). Standard errors are clustered at the firm level. P-values of heteroskedasticity consistent standard errors are depicted in parentheses with ***, **, * indicating statistical significance at 1%, 5% and 10% respectively.

	Equity/Total Proceeds	Debt/Total Proceeds	Equity from public sources	Equity from private sources	Long-term debt/ Total debt		FX Debt/Total debt	
					No rating	Rating	High EFD	Low EFD
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Net Assets$_{t-1}$	0.197***	0.129***	0.543***	0.222**	0.030***	0.006	0.084***	0.081***
	(0.000)	(0.000)	(0.000)	(0.021)	(0.000)	(0.647)	(0.000)	(0.000)
Age$_t$	-0.247***	-0.081**	-0.486***	-0.370	0.007	-0.001	0.006	-0.112***
	(0.000)	(0.049)	(0.000)	(0.117)	(0.668)	(0.977)	(0.784)	(0.002)
Cash$_{t-1}$	-2.109***	-1.086**	-2.595**	0.497	-0.536**	0.371	0.360	1.157**
	(0.000)	(0.047)	(0.026)	(0.859)	(0.015)	(0.306)	(0.195)	(0.012)
Cash-flow$_{t-1}$	-0.880***	0.734**	-1.056	-0.657	0.199	0.209	0.405**	0.358
	(0.003)	(0.015)	(0.104)	(0.682)	(0.105)	(0.324)	(0.018)	(0.169)
IndustryM2B$_t$	0.503***	0.512***	0.883**	0.619	0.174***	0.057	0.027	0.070
	(0.001)	(0.001)	(0.013)	(0.532)	(0.008)	(0.621)	(0.803)	(0.538)
IndustryLEV$_t$	0.101	1.914***	0.205	0.812	0.755***	0.479*	-0.459*	0.441
	(0.799)	(0.000)	(0.826)	(0.742)	(0.000)	(0.081)	(0.051)	(0.290)
Promoters$_t$	-0.008***	0.002*	-0.474***	-0.816***	-0.001	-0.001	-0.000	0.002**
	(0.000)	(0.093)	(0.001)	(0.008)	(0.145)	(0.102)	(0.683)	(0.024)
Group	-0.165***	-0.249***	-0.017***	-0.006	-0.091***	-0.014	-0.052*	0.011
	(0.003)	(0.000)	(0.000)	(0.298)	(0.000)	(0.715)	(0.098)	(0.837)
Stock returns$_{t-1}$	0.005	-0.013	-0.002	0.141	0.003	-0.029*	-0.006	0.011
	(0.744)	(0.374)	(0.935)	(0.153)	(0.542)	(0.054)	(0.409)	(0.488)
Stock returns$_{t+1}$	0.074**	0.044**	0.119**	0.316*	0.015*	-0.030	-0.002	0.015
	(0.046)	(0.033)	(0.041)	(0.072)	(0.085)	(0.464)	(0.880)	(0.545)
StockMarket/GDP$_t$	0.019**	0.028***	0.029**	0.070	0.001	-0.008	-0.028***	-0.032***
	(0.015)	(0.000)	(0.032)	(0.126)	(0.812)	(0.130)	(0.000)	(0.000)
GDP growth$_t$	0.181***	-0.090	0.455***	0.318	0.027	-0.096**	-0.126***	-0.129**
	(0.010)	(0.196)	(0.000)	(0.447)	(0.361)	(0.040)	(0.001)	(0.020)
PrCredit/GDP$_t$	-0.060**	-0.105***	-0.104**	-0.157	-0.011	0.036*	0.140***	0.158***
	(0.042)	(0.000)	(0.049)	(0.425)	(0.318)	(0.059)	(0.000)	(0.000)
constant	-2.011***	0.962	-5.584***	-5.772*	0.019	0.213	-3.005***	-3.391***
	(0.001)	(0.113)	(0.000)	(0.098)	(0.940)	(0.622)	(0.000)	(0.000)
pseudo R^2	0.068	0.015	0.104	0.028	0.049	0.162	0.206	0.068
Obs.	3,945	3,926	3,933	3,933	1,846	473	1,194	499

Table 2.3 Spending of issue proceeds on cash savings

This Table studies the relation between firms' cash savings and issue proceeds, following equation (2.2). The dependent variable in all specifications is the annual change in cash holdings to assets net of cash. *Equity proceeds* and *Debt proceeds* are net proceeds from equity and debt capital raising, respectively. *More Equity* is a dummy variable which takes values one if firm's equity proceeds exceed current finance needs, i.e. $More\ Equity = 1\ if\ Equity\ proceeds_{t=0} > \sum_{t=0}^{t=2} Capex$. Similarly, *More Debt* is a dummy taking values one if $Debt\ proceeds_{t=0} > \sum_{t=0}^{t=2} Capex$. The model includes also the inverse-Mills ratio estimated separately for equity and debt capital choice (See Appendix, Annex 2.B). The first four columns present results from the pre-crisis period, i.e. from 2001/2 until 2006/7. Column (3) presents results for firm-years with leverage above the industry median and a proportion of long-term debt below the industry median (*High refinancing risk*). Column (4) presents results for firm-years with leverage above the industry median and a proportion of long-term debt above the industry median (*Low refinancing risk*). Column (5) presents results from the crisis period, i.e. for years 2007/8-2008/9. Definitions for the rest of the variables are provided in the Appendix (Annex 2.A). Standard errors are clustered at the firm level and p-values of heteroskedasticity-consistent standard errors are depicted in parentheses with ***, **, * indicating statistical significance at 1%, 5% and 10% respectively.

	All firms	All firms	High refinancing risk	Low refinancing risk	Crisis
	(1)	(2)	(3)	(4)	(5)
Equity proceeds	0.408***	0.315***	0.066	0.263***	0.471***
	(0.000)	(0.000)	(0.643)	(0.006)	(0.000)
Equity proceeds × More Equity		0.235***	0.378*	0.028	0.178
		(0.009)	(0.055)	(0.873)	(0.242)
Debt proceeds	0.073***	0.069***	0.034	0.043	0.017
	(0.000)	(0.000)	(0.249)	(0.105)	(0.549)
Debt proceeds × More Debt		0.015	0.030	0.004	0.108***
		(0.508)	(0.550)	(0.918)	(0.009)
Capex	-0.027***	-0.024***	-0.005	-0.009	-0.000
	(0.000)	(0.001)	(0.757)	(0.531)	(0.985)
Total Assets	0.005***	0.005***	0.003	0.005	0.011***
	(0.002)	(0.002)	(0.543)	(0.107)	(0.009)
Cash-flow	0.064***	0.064***	0.021	0.049***	0.091***
	(0.000)	(0.000)	(0.187)	(0.000)	(0.000)
Sales Growth	0.008***	0.008***	0.015***	0.010***	0.014***
	(0.000)	(0.000)	(0.000)	(0.005)	(0.000)
Leverage	-0.016***	-0.015**	-0.029*	0.001	0.004
	(0.009)	(0.013)	(0.072)	(0.955)	(0.783)
$Mills_{Equity}$	-0.052***	-0.052***	-0.056***	-0.065***	0.000
	(0.000)	(0.000)	(0.002)	(0.000)	(0.965)
$Mills_{Debt}$	0.079***	0.079***	0.065***	0.128***	-0.109***
	(0.000)	(0.000)	(0.006)	(0.000)	(0.000)
constant	-0.054***	-0.053***	0.019	-0.102**	0.038
	(0.007)	(0.008)	(0.736)	(0.027)	(0.359)
Firm & Year F.E.	X	X	X	X	X
adj. R^2	0.117	0.119	0.092	0.136	0.134
Obs.	5,148	5,148	1,166	1,392	2,616

Table 2.4 Cash savings and investment during crisis

This Table presents estimates from panel regressions on crisis-period firm investment as a function of firm's cash reserves. *Crisis* is a dummy variable taking values one for fiscal years 2007/8 and 2008/9, and zero for the two years before. *Cash reserves* in column (1) is firms' cash holdings measured one year prior to the onset of the crisis. They are measured two to four years before the crisis in columns (2) to (4), respectively. The remaining columns replace cash with excessive equity (*Equity*) and debt (*Debt*) proceeds of firms 4 years before the crisis. Excess proceeds for each type is computed as $finance_{t=0} - \sum_{t=0}^{t=2} Capex_{it}$, with $finance = \{Equity, Debt\}$. Descriptions of the rest of variables are provided in the Appendix (Annex 2.A). Heteroskedasticity-consistent standard errors are clustered at the firm level and p-values are depicted in parentheses with ***, **, * indicating statistical significance at 1%, 5% and 10% respectively.

	-1 year	-2 years	-3 years	-4 years	E	D	E & D
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crisis	-0.011***	-0.007***	-0.007***	-0.007***	-0.003	-0.001	-0.000
	(0.000)	(0.003)	(0.002)	(0.003)	(0.104)	(0.646)	(0.953)
Crisis × Cash Reserves	0.074**	-0.008	-0.006	-0.016			
	(0.030)	(0.804)	(0.870)	(0.639)			
Crisis × $Equity_{(1)}$					0.055***		0.034***
					(0.000)		(0.001)
Crisis × $Debt_{(2)}$						0.049***	0.034***
						(0.000)	(0.004)
Cash-flow	0.032**	0.031**	0.031**	0.031**	0.032**	0.031**	0.032**
	(0.020)	(0.026)	(0.025)	(0.025)	(0.019)	(0.022)	(0.019)
M2B	0.008**	0.007*	0.007*	0.007*	0.005	0.004	0.004
	(0.031)	(0.056)	(0.054)	(0.054)	(0.147)	(0.270)	(0.293)
constant	0.043***	0.045***	0.045***	0.045***	0.047***	0.049***	0.049***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm F.E.	X	X	X	X	X	X	X
adj. R^2	0.013	0.011	0.011	0.011	0.034	0.037	0.043
Obs.	4,736	4,736	4,736	4,736	4,736	4,736	4,736
(1) = (2)							0.996

Table 2.5 Cash savings out of issue proceeds

This Table presents results from examining the cumulative impact on cash holding in the years that follow capital-raising activities, as described in equation (2.4). The dependent variable in all models is $Y = \frac{V_t - V_0}{Assets_0} + 1$, with V_0 being firms' cash holdings at the fiscal year-end prior to issuance and V_t is the cumulative cash holdings at t = 1, 2, 3 fiscal years subsequently to the issuing year. A log-transformation of the dependent variable as presented in Section 2.5 is adopted in Panels with indication (2). The independent variables are sources of funds normalized by initial total assets. All models include the natural logarithm of contemporaneous total assets as well as industry-year fixed effects. Panel A investigates the accumulation of cash savings in the aftermath of equity issuance activities. *Public* is a dummy variable that identifies firms linked to obtaining new equity from public sources. *Back2Back* is a dummy variable that identifies firms reported to issue new equity more than two times over the study period. Panel B investigates the accumulation of cash savings in the aftermath of debt issuance activities. *No rating* is a dummy variable that identifies firm-years with either no long-term debt or with long-term debt but no credit rating. P-values of heteroskedasticity-consistent standard errors clustered at the industry level are presented in parentheses, where ***,**,* denotes statistical significance at 1%, 5% and 10%, respectively.

Panel A1. Equity Proceeds

Model	Time from equity	Equity proceeds	Equity proceeds × Public	Equity proceeds × Public × Back2Back	Debt proceeds	Other proceeds	Assets	constant	R^2 [Obs.]
(1a)	t=1	1.564			0.353**	0.205	0.030*	0.682***	0.326
		(0.124)			(0.038)	(0.195)	(0.074)	(0.002)	[1,180]
(1b)		0.293	1.685*		0.418**	0.271	0.030*	0.651***	0.402
		(0.275)	(0.092)		(0.023)	(0.126)	(0.055)	(0.002)	[1,180]
(1c)		0.281	2.182*	-1.583	0.345***	0.260*	0.024**	0.709**	0.472
		(0.299)	(0.071)	(0.119)	(0.008)	(0.093)	(0.019)	(0.000)	[1,180]
(2a)	t=2	0.369*			0.129*	0.113*	0.008	0.939***	0.154
		(0.060)			(0.085)	(0.081)	(0.139)	(0.000)	[537]
(2b)		0.025	0.567***		0.158**	0.131**	0.007	0.929***	0.249
		(0.617)	(0.000)		(0.016)	(0.019)	(0.172)	(0.000)	[537]
(2c)		0.007	0.730***	-0.549***	0.136**	0.126**	0.004	0.956***	0.302
		(0.874)	(0.000)	(0.000)	(0.016)	(0.010)	(0.394)	(0.000)	[537]
(3a)	t=3	0.520***			0.111	0.053	0.011**	0.899***	0.272
		(0.008)			(0.352)	(0.472)	(0.047)	(0.000)	[359]
(3b)		0.290***	0.252*		0.106	0.052	0.011*	0.902***	0.283
		(0.003)	(0.066)		(0.375)	(0.473)	(0.050)	(0.000)	[359]
(3c)		0.132**	0.644***	-0.722***	0.088	0.035	0.008	0.936***	0.366
		(0.040)	(0.005)	(0.002)	(0.462)	(0.584)	(0.133)	(0.000)	[359]

Panel B1. Debt Proceeds

Time from debt	Equity proceeds	Equity proceeds × No rating	Debt proceeds	Debt proceeds × No rating	Operating proceeds	Operating proceeds × No rating	Assets	constant	R^2 [Obs.]
t=1	0.295***	-0.036	0.068*	0.068	0.153***	-0.026	0.001	0.982***	0.170
	(0.001)	(0.834)	(0.082)	(0.220)	(0.001)	(0.572)	(0.531)	(0.000)	[1,517]
t=2	0.462	-0.291	-0.062	0.089	0.133**	-0.044	0.001	0.986***	0.130
	(0.136)	(0.398)	(0.355)	(0.469)	(0.024)	(0.450)	(0.684)	(0.000)	[659]
t=3	1.054**	2.911*	0.164	0.037	0.536**	-0.119	0.043	0.496	0.518
	(0.039)	(0.082)	(0.677)	(0.930)	(0.010)	(0.621)	(0.213)	(0.132)	[422]

Panel A2. Equity Proceeds

Model	Time from equity	Equity proceeds	Equity proceeds × Public	Equity proceeds × Public × Back2Back	Debt proceeds	Other proceeds	Assets	constant	R^2 [Obs.]
(1a)	t=1	2.671***			1.342***	0.260	0.111***	-0.316**	0.185
		(0.000)			(0.000)	(0.185)	(0.000)	(0.032)	[1,180]
(1b)		0.881	2.373***		1.433***	0.352*	0.112***	-0.360***	0.213
		(0.206)	(0.003)		(0.000)	(0.068)	(0.000)	(0.009)	[1,180]
(1c)		0.878	2.496***	-0.395	1.415***	0.350*	0.111***	-0.345**	0.217
		(0.211)	(0.003)	(0.514)	(0.000)	(0.072)	(0.000)	(0.013)	[1,180]
(2a)	t=2	1.701**			1.126***	0.585***	0.067**	0.092	0.117
		(0.018)			(0.000)	(0.002)	(0.032)	(0.713)	[537]
(2b)		0.123	2.607***		1.257**	0.670***	0.063	0.044	0.178
		(0.408)	(0.000)		(0.000)	(0.000)	(0.037)	(0.845)	[537]
(2c)		0.083	2.965***	-1.210*	1.211***	0.659***	0.056*	0.104	0.196
		(0.569)	(0.000)	(0.090)	(0.000)	(0.000)	(0.062)	(0.642)	[537]
(3a)	t=3	2.129***			0.828*	0.290	0.047	0.181	0.147
		(0.000)			(0.054)	(0.175)	(0.169)	(0.474)	[359]
(3b)		1.441*	0.754		0.813*	0.288	0.046	0.192	0.283
		(0.062)	(0.388)		(0.060)	(0.179)	(0.178)	(0.447)	[359]
(3c)		1.079	1.652*	-1.653*	0.771*	0.249	0.040	0.269	0.169
		(0.156)	(0.099)	(0.061)	(0.078)	(0.245)	(0.253)	(0.293)	[359]

Panel B2. Debt Proceeds

Time from debt	Equity proceeds	Equity proceeds × No rating	Debt proceeds	Debt proceeds × No rating	Operating proceeds	Operating proceeds × No rating	Assets	constant	R^2 [Obs.]
t=1	4.325***	-2.099*	0.963**	0.124	1.934***	-1.085*	0.029*	0.178	0.124
	(0.000)	(0.062)	(0.038)	(0.821)	(0.001)	(0.059)	(0.077)	(0.143)	[1,517]
t=2	3.418***	-1.975	-0.563	1.387*	1.920***	-1.358**	0.020	0.304	0.125
	(0.005)	(0.160)	(0.410)	(0.098)	(0.000)	(0.020)	(0.465)	(0.114)	[659]
t=3	4.743***	-2.461*	-1.124	1.832	1.871***	-0.972*	0.010	0.352	0.291
	(0.000)	(0.076)	(0.422)	(0.209)	(0.000)	(0.793)	(0.793)	(0.210)	[422]

Table 2.6 The role of governance in cash hoarding

This Table examines the role of governance in the propensity of the firm to use proceeds for saving and investment. Panel A presents results from a probit model in which the dependent variable takes value one if the firm raised new capital, equity in columns (1) to (3) and debt in the remaining columns. *Board* is an indicator variable that takes values one if representation by independent directors is more than 50% and zero otherwise. *Foreign* is an indicator that identifies firms with foreign institutional investors and zero otherwise. The rest of variables are defined in the Appendix (Annex 2.A). Panel B presents results of equation (2.4) which measures the cumulative impact on cash holdings (*Additions to liquid assets*) and investment (*Additions to physical assets*) t = 1, 2, 3 years following equity issues. Results are presented separately for groups of firms with more efficient boards (> 50%) and those with less efficient boards (≤ 50%). P-values of tests on the equality of 'Equity proceeds' across these groups are presented at the bottom of Panel B (across groups of firms with more efficient and less efficient boards for '*Additions to liquid assets*' and within each group between '*Additions to liquid assets*' and '*Additions to physical assets*'). For coefficients reported, p-values of standard errors clustered at the firm level are depicted in parentheses with ***, **, * indicating statistical significance at 1%, 5% and 10% respectively.

Panel A. On the decision to raise new equity

	Issue Equity			Issue Debt		
	(1)	(2)	(3)	(4)	(5)	(6)
$Assets_{t-1}$	0.258***	0.261***	0.259***	0.120***	0.118***	0.120***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age_t	-0.240***	-0.241***	-0.240***	0.000	-0.001	0.000
	(0.000)	(0.000)	(0.000)	(0.992)	(0.973)	(0.999)
$Cash_{t-1}$	-1.154**	-1.168**	-1.194**	0.251	0.307	0.272
	(0.042)	(0.038)	(0.035)	(0.622)	(0.544)	(0.593)
$Cash\text{-}flow_{t-1}$	-0.312	-0.264	-0.321	0.644**	0.604**	0.643**
	(0.315)	(0.395)	(0.303)	(0.015)	(0.021)	(0.015)
$IndustryM2B_t$	0.473***	0.498***	0.483***	0.277*	0.300**	0.276*
	(0.007)	(0.004)	(0.006)	(0.072)	(0.050)	(0.073)
$IndustryLEV_t$	0.086	0.106	0.080	1.351***	1.434***	1.365***
	(0.846)	(0.810)	(0.858)	(0.001)	(0.000)	(0.000)
$Promoters_t$	-0.010***	-0.010***	-0.010***	0.001	0.001	0.001
	(0.000)	(0.000)	(0.000)	(0.527)	(0.477)	(0.533)
Group	-0.230***	-0.237***	-0.240***	-0.284***	-0.279***	-0.284***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Board	0.114*		0.157**	0.016		0.051
	(0.054)		(0.034)	(0.771)		(0.487)
Foreign		-0.113**	-0.100		0.011	0.031
		(0.037)	(0.122)		(0.810)	(0.578)
Board × Foreign			-0.094			-0.080
			(0.437)			(0.452)
constant	-1.979***	-1.934***	-1.944***	-1.642***	-1.677***	-1.659***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
pseudo R^2	0.097	0.098	0.099	0.020	0.020	0.021
Obs.	5,182	5,265	5,182	5,182	5,265	5,182

Panel B. On the decision to save proceeds as cash or use for investment

	Time from Equity	Equity proceeds	Debt proceeds	Other proceeds	Assets	constant	adj. R^2 [Obs.]
			Board independence > 50%				
Additions to liquid assets	t=1	0.857***	0.313**	0.116	0.010**	0.885***	0.412
		(0.000)	(0.021)	(0.113)	(0.038)	(0.000)	[337]
	t=2	0.793***	0.192*	0.200*	0.012	0.888***	0.087
		(0.009)	(0.058)	(0.077)	(0.538)	(0.000)	[153]
	t=3	0.168	-0.460	-0.222	0.048	0.724***	0.139
		(0.506)	(0.162)	(0.340)	(0.072)	(0.000)	[101]
Additions to physical assets	t=1	0.292***	0.033	-0.235***	-0.001	1.011***	0.197
		(0.007)	(0.793)	(0.026)	(0.894)	(0.000)	[324]
	t=2	0.413	0.440	-0.281	-0.011	1.086***	0.179
		(0.111)	(0.162)	(0.206)	(0.597)	(0.000)	[124]
	t=3	1.462***	0.676*	0.135	0.013	0.853	0.371
		(0.001)	(0.060)	(0.373)	(0.706)	(0.001)	[81]
			Board independence ≤ 50%				
Additions to liquid assets	t=1	1.828	0.403*	0.242	0.029*	0.067***	0.363
		(0.145)	(0.095)	(0.199)	(0.084)	(0.004)	[818]
	t=2	0.344	0.169*	0.126	0.008	0.940***	0.216
		(0.113)	(0.098)	(0.106)	(0.392)	(0.000)	[370]
	t=3	0.599***	0.164	0.083	0.015	0.860***	0.470
		(0.005)	(0.227)	(0.223)	(0.115)	(0.000)	[250]
Additions to physical assets	t=1	0.073*	0.329***	-0.093**	0.005	0.986***	0.110
		(0.095)	(0.000)	(0.017)	(0.326)	(0.000)	[793]
	t=2	0.556***	0.791***	-0.014	0.023	0.865***	0.200
		(0.000)	(0.000)	(0.834)	(0.265)	(0.000)	[318]
	t=3	0.546**	0.542***	-0.230**	-0.038	1.307**	0.096
		(0.025)	(0.004)	(0.033)	(0.614)	(0.013)	[212]

	Additions to liquid assets	*Additions to liquid vs. physical assets*	
p-values	*Strong (>50%) vs. Weak (≤ 50%)*	*Within Strong (>50%)*	*Within Weak (≤ 50%)*
t=1	0.330	0.002	0.127
t=2	0.376	0.869	0.582
t=3	0.043	0.000	0.447

Table 2.7 Group affiliation and the issuance-saving link

This section examines firms' post-issuance saving behavior with respect to firms' affiliation to business groups. Results from testing equation (2.4) are presented separately for stand-alone firms and group firms. The dependent variable measures the cumulative impact on cash holding (*Additions to liquid assets*) and investment (*Additions to physical assets*) t = 1, 2, 3 years following an equity issue event. Models control for different sources of funds, initial assets and include industry-year fixed effects. P-values of t-tests on the equality of 'Equity proceeds' across specifications are presented at the bottom of the table. P-values of standard errors clustered at the industry level are depicted in parentheses with ***, **, * indicating statistical significance at 1%, 5% and 10% respectively.

	Time from equity	Equity proceeds	Equity proceeds × Public	Debt proceeds	Other proceeds	Assets	constant	adj. R^2 [Obs.]
				Group-affiliated firms				
Additions to liquid assets	t=1	1.005**	-0.409	0.296**	0.081***	0.009*	0.913***	0.364
		(0.014)	(0.329)	(0.017)	(0.008)	(0.062)	(0.000)	[507]
	t=2	0.197	0.104	0.214	0.162	-0.009	1.070***	0.195
		(0.267)	(0.617)	(0.150)	(0.142)	(0.538)	(0.000)	[230]
	t=3	0.199**	-0.134	0.004	0.008	0.008	0.965***	0.061
		(0.026)	(0.388)	(0.939)	(0.769)	(0.317)	(0.000)	[148]
Additions to physical assets	t=1	-0.048	0.147	0.414**	-0.055	0.007	0.961***	0.086
		(0.625)	(0.184)	(0.011)	(0.542)	(0.219)	(0.000)	[498]
	t=2	0.137	0.309	0.727***	0.050	0.012	0.921***	0.172
		(0.554)	(0.463)	(0.001)	(0.681)	(0.595)	(0.000)	[191]
	t=3	0.829	-0.513	0.170	-0.027	-0.074	1.648*	0.044
		(0.204)	(0.558)	(0.451)	(0.847)	(0.538)	(0.072)	[124]
				Stand-alone firms				
Additions to liquid assets	t=1	0.185	2.471*	0.577**	0.355*	0.033*	0.585**	0.490
		(0.318)	(0.057)	(0.041)	(0.099)	(0.058)	(0.014)	[673]
	t=2	0.021	0.674***	0.183**	0.123**	0.017**	0.865***	0.297
		(0.614)	(0.001)	(0.016)	(0.027)	(0.018)	(0.000)	[307]
	t=3	0.266**	0.479***	0.025	0.070	0.005	0.005***	0.371
		(0.038)	(0.004)	(0.745)	(0.400)	(0.492)	(0.000)	[211]
Additions to physical assets	t=1	-0.075	0.192	0.154	-0.169***	0.012**	0.943***	0.151
		(0.567)	(0.173)	(0.027)	(0.000)	(0.076)	(0.000)	[635]
	t=2	0.920**	-0.276	0.689***	-0.116	0.030	0.804***	0.264
		(0.042)	(0.546)	(0.000)	(0.104)	(0.105)	(0.000)	[257]
	t=3	0.514	0.283	0.796***	-0.221***	0.025	0.830***	0.500
		(0.168)	(0.483)	(0.000)	(0.000)	(0.197)	(0.000)	[173]

	Additions to liquid assets	*Additions to liquid vs. physical assets*	
p-values	*Groups vs. Stand-alones*	*Within Group firms*	*Within Stand-alone firms*
t=1	0.189	0.011	0.130
t=2	0.042	0.814	0.066
t=3	0.037	0.894	0.560

Appendix to Chapter 2

Annex 2.A Variables definition

VARIABLE	DESCRIPTION (Source: *Prowess*, unless otherwise stated)
Age	Ln (years since incorporation)
Total Assets	Ln(Total Assets)
Assets	Ln(Total Assets net of Cash)
Board	Dummy taking values one if board independence ratio above 50%
Capex	(Δ.Fixed Assets + Depreciation)/ Assets
Cash	(Cash holdings + Marketable securities)/ Assets
Cash-flow	Cash flows from operations/Assets
Debt proceeds	Net cash flows from proceeds from long-term borrowings
Equity proceeds	Net cash flows from proceeds from share issues
Foreign	Dummy taking values one if firm is targeted by FIIs
GDP growth	Real GDP growth (Source: *World Bank*)
Group	Indicator taking values one if firm is affiliated with business groups
IndustryLEV	Median leverage (Leverage) of firm's industry
IndustryM2B	Median market-to-book ratio (M2B) of firm's industry
Leverage	(Short-term debt + Long-term debt)/ Total Assets
M2B	(Total Assets + Market capitalization – Book Equity)/Total Assets
PrCredit/GDP	Credit to the private sector/ GDP (Source: *World Bank*)
Promoters	% shares held by controlling shareholders
Sales Growth	Δ.Sales/ $Sales_{t-1}$
Stock returns	Abnormal stock returns, calculated based on a self-constructed value-weighted market index using as weights the market capitalization
StockMarket/GDP	Stock market capitalization/ GDP (Source: *World Bank*)

Annex 2.B Raising new capital

This table presents results from explaining firms' decision to raise new capital in the form of equity and debt before the crisis. Columns (1) and (2) present results from a probit model used for deriving the inverse Mills ratio in Section 2.4.2. The dependent variables take values one for firm-years with reported positive net issuance proceeds from equity and debt-linked activities, and zero otherwise. Definitions of the rest of the variables are provided in the Appendix (Annex 2.A). P-values of standard errors clustered at the firm level are presented in parentheses with ***,**,* denoting statistical significance at 1%, 5% and 10% respectively.

	Raise Equity	*Raise Debt*
	(1)	(2)
$Assets_{t-1}$	0.260***	0.118***
	(0.000)	(0.000)
$Cash_{t-1}$	-0.241***	-0.001
	(0.000)	(0.975)
Age_{t}	-1.116**	0.302
	(0.047)	(0.550)
$Cash\text{-}flow_{t-1}$	-0.255	0.604**
	(0.409)	(0.022)
$IndustryM2B_{t}$	0.487***	0.301**
	(0.005)	(0.049)
$IndustryLEV_{t}$	0.122	1.431***
	(0.782)	(0.000)
Group	-0.010***	0.001
	(0.000)	(0.480)
$Promoters_{t}$	-0.230***	-0.279***
	(0.001)	(0.000)
constant	-1.627***	-1.865***
	(0.000)	(0.000)
Year dummies	X	X
Obs.	5,265	5,265

~ CHAPTER THREE ~

Financial market integration and firms' access to capital: Evidence from the National Stock Exchange in India

Abstract

This paper empirically investigates implications of deepening domestic capital markets on real-firm behavior. It explores the unique setting of firms already listed on a stock exchange, cross-listing shares on a new domestic stock exchange as a means to enhancing their access to outside capital. Following the opening of India's National Stock Exchange in the early 1990s, dual-listed firms experienced higher levels of investment than their peers which remained listed on the country's primary market (Bombay Stock Exchange). These results can be explained by larger equity issues and reduced information asymmetries which lowered the cost of capital, particularly for financially constrained firms. However, valuation benefits of cross-listings were persistent only in firms sustaining a more liquid trading environment for their shareholders. This evidence reveals that deepening domestic capital markets can enhance firms' access to capital, but entail a valuation premium only through the channel of enhanced stock liquidity.

3.1 Introduction

Financial markets in emerging economies have experienced significant changes over the past two decades, both because of promoting financial market reforms on the inside and better integrating with the world economy on the outside (e.g. Doidge et al., 2013). This paper focuses on the former and in particular, on the unique setting of public firms cross-listing shares on a new *domestic* stock exchange, as a means to enhancing their access to capital and overcoming capital market frictions in previously fragmented markets.

Our experimental setting is the opening of the National Stock Exchange (henceforth 'NSE') in India in the middle 1990s. NSE emerged as the country's first stock exchange to adopt technological advances in trading. These aimed to promote transparency in price formation and overcome geographical limits in traditional floor-based trading systems. As a result, firms would have access to a larger and deeper investor base while investors would benefit from greater diversification options and lower transaction costs in trading.

The main goal of the chapter is to study: i) whether cross-listing on the new market had implications on firm investment and financing, and, ii) whether financial benefits were more pronounced to firms with higher *ex-ante* financial constraints. These questions are important as overcoming investment barriers and capital market frictions at home is often cited by managers as a primary reason for pursuing a cross-listing overseas (e.g. Bancel and Mittoo, 2001; 2009).[17] Therefore, if equity market developments reduce incentives to pursue a cross-border listing, they can mitigate the negative implications of the migration of order flows on stock liquidity conditions in the home market (e.g. Domowitz et al., 1998).

The opening of a new stock exchange provides a unique opportunity to distinguish between competing cross-listing theories debated in the literature. In particular, a second listing within a country's borders is less likely to entail significant changes to firm-level corporate governance as opposed to cross-listing on advanced capital markets. Hence, it allows us to interpret changes in investment of dual-listed firms as suggestive of the likely influence of

[17] See Karolyi (2006; 2012) for literature reviews of cross-listing theories and the underlying motives.

reduced barriers in equity financing rather than of ‘bonding’ to higher governance standards.

To test these ideas, we collect information for more than 850 firms cross-listing on the new market and their peers which remained listed on the country’s primary market (Bombay Stock Exchange, henceforth ‘BSE’). Results from a difference-in-differences model which compares the investment of dual-listed firms to that of their peers in the BSE show that the former benefited from relatively higher investment levels subsequently to cross-listing. Results were stronger in financially constrained firms and are robust to testing for endogeneity in the cross-listing decision. They support the view that greater equity market integration can reduce investment barriers and improve firms’ access to capital.

Additional tests explore sources of firms’ higher investment. Results identify capital and cost-of-capital implications of cross-listing. First, they show that dual-listed firms engaged with more equity-financed investments than their peers in the BSE subsequently to cross-listing shares on the new market. Second, they show that dual-listed firms would benefit from a lower cost of capital, particularly among firms facing larger information asymmetry problems. Putting these findings together, dual-listed firms were likely to expand their access to capital and benefit from reduced information asymmetries in raising new capital.

However, cross-listing benefits were not uniformly distributed among dual-listed firms. Within this sample, there is a cohort of firms which, although not associated with high external finance needs, cross-listed shares within the first few months after the opening of the new market. These firms expanded their shareholder base and benefited from higher stock liquidity and stock valuations over non-cross-listed firms in the primary market (BSE). These results are consistent with theories which posit that greater risk sharing subsequently to cross-listing can create a more liquid trading environment for firm’s shares in the home market, with implications on firm’s cost of capital and stock valuations (e.g. Errunza and Miller, 2000).

By contrast, firms which took more time to complete cross-listing were likely to use the new market mainly as a means to raising new equity for financing investments. Nevertheless, their stock liquidity and valuations in the primary market returned to pre-cross-listing levels over time. These results suggest that cross-listing valuation benefits were only transitory for firms which were not successful in sustaining a more liquid trading environment for their shareholders. These results are consistent with survey-based evidence that the creation of a more liquid environment for shareholders is a primary motivation for cross-border listings (e.g. Bancel and Mittoo, 2001; 2009). They suggest that equity market developments can create a valuation premium only through the channel of enhanced stock liquidity.

Overall, this chapter contributes to the literature on cross-listings from three main perspectives. First, it shows that financial market reforms in emerging economies can enhance firms' access to capital with implications on firm financing and investment. These findings are consistent with related work on the financial benefits of market integration at the firm-level (e.g. Patro and Wald, 2005; Bris et al., 2006). For example, Bris et al. (2006) document increases in firms' investment and declines in firms' financial constraints after the adoption of the single European currency.

Second, it presents results from a quasi-experimental setting which allows us to distinguish between competing theories in cross-listings debated in the literature. Given that cross-listing domestically may not entail significant changes in firm-level corporate governance, we can more safely interpret changes in firm investment as suggestive of the influence of reduced barriers in equity financing, rather than of 'bonding' to higher governance standards.

Finally, it shows that investors reward emerging market companies with an opportunity to create a more liquid shareholding environment. This is likely associated with firms' inherent stock liquidity problems in these markets (e.g. due to concentrated ownership). On the contrary, firms which failed to improve conditions for trading did not experience a permanent increase in valuation. These results are consistent with previous work which shows that valuation benefits in cross-border listings are only transitory for firms which are not successful in broadening their shareholder base (e.g. King and Segal, 2009).

The rest of the chapter is organized as follows. Section 3.2 summarizes the cross-listing theories and presents the backdrop of the new market. Section 3.3 presents the data and the proposed methodology. Section 3.4 discusses the main results. Section 3.5 presents results from tests on endogeneity. Section 3.6 explores potential sources of relaxed financial constraints. Finally, Section 3.7 concludes.

3.2 The cross-listing decision and the opening of the NSE

3.2.1 Why do firms cross-list their shares?

Theory and evidence propose two main motives associated with the cross-listing decision. The traditional view relates cross-border listings with the degree of segmentation and stock liquidity in domestic financial markets. Investment barriers, such as regulatory limits on foreign ownership and international capital flows, can place restrictions on firms' access to capital. This may induce managers to pursue a second listing abroad to expand firm's investor base and increase its stock liquidity. Indeed, an enlarged and more liquid trading environment for shareholders is often cited by managers in surveys as a primary motivation for cross-listing overseas (e.g. Bancel and Mittoo, 2001; 2009). This is accompanied by empirical evidence that cross-listing reduces investors' required returns with implications on firm's cost of capital and stock valuation (e.g. Miller, 1999; Foerster and Karolyi, 1999; Errunza and Miller, 2000; Bris et al., 2007).

However, increasing integration of financial markets around the world, especially in the aftermath of the Asian financial crisis and the economic unification in Europe, was not accompanied by a declining number of international cross-listings. This puzzle inspired Stulz (1999) and Coffee (1999; 2002) to propose an alternative view of cross-listings. That is, a firm's internal governance problems at home may be a primary motivation to pursue a second listing overseas. The main idea here is that corporate insiders can credibly commit to reducing agency and information asymmetry problems with outside investors by 'bonding' to higher disclosure and governance standards of advanced capital markets. A large amount of empirical work has interpreted reductions in firms' cost of capital and permanent valuation gains as suggestive of the more disciplined corporate environment after cross-listing (e.g. Reese and Weisbach, 2002; Doidge et al., 2009; Hail and Leuz, 2009).

In a similar vein, a strand in the literature focused on changes in the information environment of the firm after cross-listing. It argues that an enlarged investor base and additional disclosure in the new market can lower information asymmetries and trading costs for investors in the home market. For example, the model by Chemmanur and Fulghieri (2006) suggests that this can take place through the choice of the stock exchange, while the work by Fernades and Ferreira (2008) through greater informativeness of stock prices.

Although both 'market segmentation' and 'bonding' theories presented above associate cross-listing with enhanced firm access to capital (i.e. through reduced investment barriers and improved firm-level governance, respectively), implications of cross-listing on firm investment remain empirically underexplored. As an exception, Lins et al. (2005) examine whether cross-listing on more advanced capital markets can alleviate a firm's financial constraints. They use the investment cash-flow sensitivity proposed by Fazzari et al. (1988) to estimate firms' external financial constraints. Their evidence shows that enhanced access to foreign capital alleviated constraints of firms cross-listing on U.S. stock markets.

Differently from this work, we examine implications on firm investment when the firm has the opportunity to overcome fragmented equity markets and reach trapped sources of capital within the country's borders. To do so, we adopt more recent developments in the literature on financial constraints. In particular, we use the indices proposed by the work of Kaplan and Zingales (1997), Whited and Wu (2006) and Hadlock and Pierce (2010) to measure firm-level financial constraints. Although developed on U.S. data, these measures have been extensively used by non-U.S. and cross-country studies (e.g. Bris et al., 2006; Bena et al., 2015) as a means to overcoming concerns with different interpretations of the investment cash-flow sensitivity (See for example the discussion in Almeida et al. (2004)).

From a different perspective, our work is related to the study by Carvahlo and Pennacchi (2012). The authors study in another emerging economy, Brazil, the role of corporate governance in improving firm valuation when the firm voluntarily migrates its listing status to a category with higher disclosure and governance requirements. Similarly, this chapter studies developments in capital market institutions which improve corporate outcomes by reducing market frictions. However, it differs in two perspectives. First, it studies firms which are listed on two domestic stock exchanges simultaneously rather than firms migrating to a new listing status. This allows us to interpret findings in the context of cross-listing theories. Second, the birth of a stock exchange provides a unique opportunity to empirically examine predictions of theories on the competition between stock exchanges for order flows and liquidity (e.g. Chemmanur and Fulgieri, 2006).

Before proceeding with the description of the data and the proposed methodology, we briefly present the background of the new market and how it might have enhanced firms' access to capital.

3.2.2 The opening of the NSE and dual-listed firms' access to capital

How relevant are cross-listing theories presented above to firms' decision to cross-list on the NSE? Before the opening of the NSE, equity markets in India were fragmented by the presence of multiple local stock exchanges. These offered poor diversification options to investors and weak risk-sharing benefits to companies. The largest of these exchanges, the BSE, was offering broker-based floor-trading services to investors with limited outreach across the country and weak structures for governance and regulation. Thomas (2006) notes that order execution was performed behind the scenes and price formation was directed by the private interests of brokerage firms, in the absence of an automated and transparent system for the settlement and clearing of market orders.

The NSE was established in 1994 as a demutualized form of organization on par with stock exchanges in advanced economies and in contrast to the broker-run structure of the BSE. Krishnamurti et al. (2003) show that the new market's organizational structure had implications on the level of transaction costs incurred by investors. Importantly, they argue that the most profound effect on domestic equity markets came from the adoption of advanced information technology in trading. Specifically, the new market established an automated trading system which consolidated investors' orders from across the country electronically in a single trading platform. As a result, traders from all over the country could bypass limitations of floor trading and perform transactions with one another with greater transparency in price formation.

These developments suggest that the opening of the new market may have contributed to a greater integration in domestic equity markets. In particular, the new market may have lifted investment barriers and reduced capital market frictions which inhibit investors with surplus funds to integrate with firms in need of capital. Given that cross-listing on the new market was not accompanied by substantial changes in firms' governance environment (similar to cross-listings on advanced capital markets), we can interpret implications on firm investment consistent with 'market segmentation' theories.

As presented earlier, these theories posit that cross-listing firms may benefit from an enlarged investor base and enhanced access to outside funding. Similarly to Lins et al. (2005), we argue that this benefit should be more pronounced to firms facing difficulties in raising outside capital *ex-ante,* i.e. to financially constrained firms. Moreover, given that the main incremental change in the new market era was the adoption of advanced information technology in trading, we argue that relaxed financial constraints would be more pronounced to firms facing information asymmetry problems. We explore empirically these arguments in our multivariate tests below. Right next, we present the data and the methodology proposed to perform these tests.

3.3 Data and methodology

3.3.1 Description of data

The equities segment of the NSE commenced its operations in late 1994. More than 350 BSE-listed firms completed a second listing on the new market within the year of opening (See Figure 3.1). The number of dual-listed firms increased more than twofold in 1995 and it dropped substantially over the following years. Overall, almost 80% of all firms cross-listing on the NSE during the 1990s completed listing within the first two years of the NSE opening, i.e. in 1994 and 1995. For the scope of empirical analysis, we treat this group of dual-listed firms as the 'treatment' group. The main interest is to compare the investment behavior of the treatment group with that of their peers which remained listed on the BSE ('control' or 'benchmark' firms) from before to after the opening of the NSE.

Data on Indian public firms are extracted by the *Prowess* database, compiled by the Center for Monitoring the Indian Economy (CMIE). Prowess provides detailed balance sheet and stock market data for the years starting in 1991. To avoid including firm-years which may associate with the Asian financial crisis at the end of the 1990s, we collect data for the period 1991-1998. This allows us enough years before the opening of the new market (1991-1993) and in the aftermath (1996-1998) to study changes in corporate outcomes for firms which completed a second listing in years 1994 and 1995. For the scope of analysis, we name these firms as NSE 94' firms and NSE 95' firms, respectively.

We identify firms cross-listed on the NSE as follows. From the full sample of BSE-listed firms, we drop firms in which the controlling shareholder ('promoter') is the government or foreign-denominated entities. We also drop firms with years of incorporation after 1990 to avoid including newly-established firms in our sample that would likely be classified as financially constrained. Hence, our sample of cross-listed firms are firms already listed on the BSE with first trading on the NSE in 1994 or 1995. We identify 856 such firms. Together with their peers listed on the BSE, they create a pool of 2,740 public firms.

Table 3.1 presents summary statistics for the main variables of interest which appear in multivariate tests discussed below. In particular, we present mean values for dual-listed firms before and after cross-listing shares on the new market and we compare them against (unmatched) benchmark firms. Evidence from the univariate analysis shows that the average dual-listed firm increased its total assets and reduced its debt-to-assets ratio after cross-listing on the NSE. In addition, cross-listing associated positively with foreign expansion as evidenced by the positive and statistically significant change in the fraction of firms' foreign sales. Moreover, cross-listing had positive spill-over effects on firms' stock liquidity in the primary market (BSE). This suggests that shareholders in the primary market may have benefited from a more liquid trading environment subsequently to firm's cross-listing on the new market.[18]

[18] We use the number of zero daily stock returns as a proxy for firms' stock illiquidity. This measure has been proposed by previous studies to outperform alternatives (e.g. bid-ask spread) in capturing stock liquidity in emerging markets, and particularly in the Indian setting (e.g. Lesmond, 2005; Bekaert et al., 2007). The idea here is that when high transaction costs deter informed investors from trading (i.e. stocks are illiquid), more zero returns will be observed within the year as no new information has been incorporated into stock prices.

When compared against their peers which remained listed on the BSE, dual-listed firms increased investment relatively more in the period following cross-listing. Specifically, the investment-to-assets ratio was 2.5 percentage points higher before cross-listing and 2.9 percentage points higher in the aftermath. This represents an economically significant increase of 6% (=(0.029-0.025)/0.068). This finding, although preliminary at this stage, provides some early support that cross-listing on the new market may have improved firms' access to capital and enhanced their ability to finance investment.

3.3.2 Methodology

Our main specification is a difference-in-differences model which estimates differences in investment between dual-listed firms and their BSE-listed peers, before and after cross-listing shares on the new market. To study financing implications of cross-listing with respect to firms' financial constraints, we also introduce an indicator variable whose values depend on whether the firm can be classified as 'constrained' before cross-listing. Financial constraints are estimated by creating indices based on the work of Kaplan and Zingales (1997), Whited and Wu (2006) and Hadlock and Pierce (2010). Definitions of the indices and details on their construction are provided in the Appendix (Annex 3.B).

In particular, for our sample in which firm *i* is observed annually over years *t*, we estimate the relation between cross-listing and firm investment by the following regression.

$$CAPEX_{it} = \alpha_i + \theta_t + \beta X_{it} + \delta_1 After_{it} + \delta_2(After_{it} \times Constrained_i) + \varepsilon_{it} \qquad (3.1)$$

where *CAPEX* is firms' capital investment measured as the change in fixed assets to total assets. *After* is a dummy variable which equals one for firm-years after a firm is cross-listed on the NSE and zero otherwise. *Constrained* is an indicator which takes values one for firms classified by the aforementioned studies as financially constrained. Its interaction term with the *After* variable will capture the incremental impact of cross-listing on the investment of firms experiencing external financial constraints. *X* is a vector of time-varying regressors which controls for differences in firm's financial characteristics. These include firms' size (*Assets*), debt (*Leverage*), profitability (*PBITDA*) and investment opportunities (*Sales Growth*).[19] The model includes also firm fixed-effects (α_i) and year dummies (θ_t) to control for time-invariant unobserved differences across firms and common time trends, respectively.

3.3.3 Investment dynamics

The underlying assumption in our difference-in-differences framework is that if the new stock market improved firms' access to capital, differences in investment with that of firms listed on the BSE would grow larger subsequently to cross-listing. To test this 'parallel trends' argument, we examine the evolution of firm investment around the cross-listing event. In particular, we use a fixed-effects model in which firm investment (CAPEX) is regressed on a set of event-year indicator variables, *Before2*, *Before1*, *After0*, *After1*, *After2* and *After3+*. These equal one for the firm-year observation *n*-years (*n* = 0, 1, 2, 3+) before or after the firm cross-lists its shares on the NSE, and zero otherwise.

$$CAPEX_{it} = \beta_0 + \sum_{s=-2}^{-1} \Gamma_s\, Before(-s)_{it} + \sum_{s=0}^{4} \Gamma_s\, After(s)_{it} + \alpha_i + \theta_t + \varepsilon_{it} \tag{3.2}$$

In our proposed specification, *Before* is an indicator taking values one if it is (s) years before cross-listing on the NSE, and *After* is an indicator that equals one if it is (s) years following cross-listing. The inclusion of firm fixed effects α_i allows us to study variations in investment around the cross-listing event relative to their peers which remained listed on the BSE. The use of year dummies δ_t controls for common time trends. Results of these tests are presented in Table 3.2.

Evidence in columns (1) shows that the investment of dual-listed firms was on average statistically indistinguishable from that of their peers before cross-listing. However, it grew larger in the aftermath and these differences likely persisted for at least three years after cross-listing. These results support evidence from the univariate analysis above that the new market facilitated higher investment levels for dual-listed firms. The point estimates from this specification in a two-year window surrounding the cross-listing event are plotted

[19] Definitions of the variables are provided in the Appendix (Annex 3.A).

in Figure 3.2. Columns (2) and (3) present results separately for firms in the NSE 94' and NSE 95' listing cohorts against their peers which remained listed on the BSE. Evidence from these tests shows that investment levels were more pronounced in the latter group of firms, i.e. firms which completed cross-listing with a delay.

The remaining columns present results on firms' stock liquidity in the primary market (BSE). They show that dual-listed firms were associated with significant improvements in the liquidity and trading environment of their shares relative to non-cross-listed firms. However, these results were persistent only in firms in the NSE 94' listing cohort. Differences in stock illiquidity with their peers in the BSE vanish in the long-term. An explanation for these findings is that advanced information technology in the new market reduced information asymmetries for dual-listed firms, leading to more homogeneous transaction costs in trading in the primary market. An alternative explanation stems from anecdotal evidence that competition between the primary and the new market led the former to adopt similar trading and information technology which reduced market frictions (e.g. Krishnamurti et al., 2003). In sum, evidence in this section suggests that implications of cross-listing were likely not uniformly distributed within the group of dual-listed firms. It suggests that different firms may have had different motives in pursuing a secondary listing in the new market. The section below sheds light on these motives by examining financial characteristics of firms before cross-listing.

3.4 Multivariate tests

3.4.1 Who goes public on the NSE?

We start our multivariate analysis by examining the *ex-ante* financial characteristics of firms cross-listing on the NSE. Following the respective literature, we use probit and Cox-proportional hazard models to predict cross-listing based on company characteristics (e.g. Pagano et al., 2002; Doidge et al., 2009; King and Segal, 2009). These models essentially predict from a set of firms that are not listed on the NSE in year t – 1 those that are more likely to be listed in year t.

$$NSE_{it}^{listing} = \beta X_{it-1} + \theta_t + \varepsilon_{it} \quad (3.3)$$

The dependent variable is a dummy variable that takes values one if firm i cross-listed shares on the NSE in year t and zero otherwise ($NSE^{listing}$). The choice of control variables X is motivated by studies such as Doidge et al. (2004) and Fresard and Salva (2010). It aims to capture differences in financial characteristics across firms associated with the cross-listing decision. These include firms' size (*Assets*) and age (*Age*) to capture differences in their level of information asymmetries and their ability to incur the listing costs in the new market, the proportion of foreign sales (*FX Sales*) to capture differences in product market exposure, the growth rate of sales (*Sales Growth*) and industry-median market-to-book ratios (*Industry M2B*) to capture differences in firm-level investment opportunities and growth across industries respectively, firms' capital structure (*Industry Leverage*) measured at the industry level to circumvent concerns over simultaneity bias with the cross-listing decision, as well as firms' profitability (*PBITDA*), dividend payouts (*DIV_dummy*) and group affiliation (*Group*) to capture differences in firms' external financial constraints. Finally, the model controls for firms' stock illiquidity (*ILLIQ_BSE*) as a potentially important determinant of the decision to cross-list on the new market.

Evidence from the first column in Table 3.3 shows that larger young firms with good investment opportunities were more likely to cross-list shares on the new market. The positive and significant coefficient of stock illiquidity further suggests that a larger and deeper investor base may have been motivating the cross-listing decision. Hence, cross-listing on the NSE may have been driven by firms' need to fund growth, particularly among firms with larger information asymmetry and liquidity problems in the primary market. Results in column (2) show that they are not sensitive to the specification used to predict cross-listing.

The remaining columns explore heterogeneity within the group of firms with a dual-listing status. They include interaction terms of all regressors with a dummy variable indicating firms cross-listing on the NSE in year 1995. These tests are performed using the probit and Cox-proportional hazard models as before.

Evidence shows that firms cross-listing on the NSE with a delay (i.e. NSE 95') were on average smaller with higher growth ratios relative to their industry peers, and greater stock illiquidity problems in the primary market. Importantly, these firms had low profitability, were less likely to pay a dividend prior to cross-listing and did not have access to groups' internal capital markets. This set of financial characteristics are likely to belong to firms associated with larger financial constraints. Indeed, studies such as Fazzari et al. (1988), Almeida et al. (2004) and Hadlock and Pierce (2010) propose that smaller young firms with good investment projects but low profitability and payouts are likely to face severe finance frictions. An explanation for this finding is that firms which completed listing with a delay might miss some of the eligibility criteria for cross-listing shares in the new market in the first few months after opening.[20] Hence, firms which lacked a track record of profits and payouts to cross-list shares in the inauguration year may have been associated with larger financial constraints before cross-listing.

3.4.2 Dual-listed firms and firm investment

This section presents the main results of the paper after using the model specification in equation (3.1). It examines whether cross-listing on the NSE improved firms' access to capital and facilitated greater investment levels for financially constrained firms. Results in Table 3.4 are presented for the full sample of dual-listed firms and separately for firms in the NSE 94' and NSE 95' listing cohorts. Firms are classified as financially constrained, based on the indices proposed by the work of Kaplan and Zingales (1997), Whited and Wu (2006) and Hadlock and Pierce (2010).

Panel A presents results after using the Kaplan and Zingales (1997) index for measuring firm-level financial constraints. Evidence shows that although dual-listed firms reduced investment relatively more than their peers in the BSE after the NSE opening, those associated with larger financial constraints largely offset the decline. These results are

[20] The NSE sets out a set of pre-requisites for cross-listing which includes, among others, a record of distributable profits and dividend payouts in at least two of the last three years before application for listing is made.

robust to controlling for firms' financial characteristics, firm fixed effects and common trends.

Panel B shows that these results are not robust to using the alternative indices of financial constraints, namely the WW-index (columns (1) to (3)), and the SA-index (columns (4) to (6)). An explanation for this discrepancy is that firm financial attributes which these indices associate financial constraints with, do not match the profile of cross-listing firms as presented in the previous section. For example, the SA-index classifies as constrained firms which are smaller and younger. However, evidence in Table 3.3 shows that larger young firms were likely to cross-list on the NSE, thus making classification of firms as constrained based on only these two characteristics possibly misleading in our sample.

Similarly, the WW-index classifies as constrained firms with low investment opportunities relative to their industry peers. In contrast, firms pursuing a secondary-listing on the NSE were firms which belonged to product markets with good growth potential and individually had good investment opportunities. On the other hand, the KZ-index classifies as constrained firms which have high debt, good investment opportunities but low profitability. These characteristics fit better the description of firms cross-listing on the NSE with a delay.

Overall, evidence in this section supports the view that cross-listing shares on the new market facilitated increased investment levels to dual-listed firms associated with financial constraints. This was more likely to apply to *ex-ante* financially constrained firms, as identified by the Kaplan and Zingales (1997) index. Given that the literature is still lacking a proper definition of financial constraints for emerging market companies and drawing on the discussion above, we consider this index as more appropriate for capturing financial constraints in our sample firms.

3.5 Tests on endogeneity

As noted earlier, the cross-listing decision is not a random decision received by the manager. Hence, its relation to firm investment may suffer from endogeneity concerns. To mitigate these concerns, this section employs a number of robustness tests. First, it presents results from propensity score matching to control for observable differences between 'treated' (dual-listed firms) and 'control' firms (BSE-listed peers). Second, it presents results from a treatment effects model to control for the influence of unobservable differences across firms prior to cross-listing. Finally, it presents results from an instrumental variables model to mitigate concerns that cross-listing and firm investment may be jointly determined by some correlated factor.

3.5.1 Propensity score matching

This section presents results on firm investment after using propensity score matching. The concern here is that characteristics of dual-listed firms before cross-listing may also explain why these firms increase their investment relatively more afterwards. To address this concern, we match dual-listed firms with their peers listed on the BSE on a set of covariates associated with the listing decision. Our goal is to find close matches of dual-listed firms within the pool of firms that were eligible to cross-list on the NSE but chose not to.

The matching starts with a probit model in which the treatment dummy is regressed on the same set of explanatory variables as those included in Table 3.3. Then, using the propensity scores or else the predicted probabilities from the estimated probit regression, we find for each dual-listed firm-year observation the nearest-neighbor match of benchmark firm-year observations which minimizes the absolute difference in propensity scores and falls in the common support area. Results of these tests are presented in Table 3.5. Results are presented for dual-listed firms against their matched firms and separately for firms in the NSE 94' and NSE 95' listing cohorts. For each test, changes in investment are reported in detail for treated firms (dual-listed), non-treated firms (benchmark) and control firms (matched benchmark).

Results indicate that both treated and control firms experienced a drop in investment during our period of study. This is consistent with univariate statistics presented above.[21] The

[21] Reductions in investment may be explained by the outburst of the Asian financial crisis at the end of our study period. For example, Gopalan and Gormley (2013) show that the collapse of India's stock markets in 1997-8 had negative implications on the investment of public firms, particularly among those likely to face more severe external financial constraints.

matching estimator shows that the drop in investment was less pronounced in firms with a secondary listing on the new market (0.012). In particular, although the average dual-listed firm would drop investment by 3.0 percentage points following cross-listing, its matched peer in the BSE would drop investment by 1.2 percentage points more.

In further tests, we find close matches in the BSE group separately for firms cross-listing within the opening year of the NSE (NSE 94') and those cross-listing later (NSE 95'). In support of our previous findings, differences in the change in investment were statistically significant only for the latter group of firms. Overall, results in this section show that differences in investment responses of dual-listed firms after cross-listing on the new market are robust to matching methods.

3.5.2 Treatment effects

Propensity score matching rests on the assumption that cross-listed firms and their peers in BSE can be matched on observable pre-listing financial characteristics. However, they may also differ along unobservable dimensions which might relate to the cross-listing decision. This section presents results from a treatment effects model which controls for potential self-selection effects.

Specifically, the model proceeds in two stages. In the first stage, we run a probit model to explain the cross-listing decision using the same set of firm financial characteristics (X) as reported in Table 3.3. The dependent variable, *NSE*, is an indicator taking values one for firm-years after which the firm became dual-listed (zero otherwise). The model yields estimates for the inverse Mills ratio (*Mills*) which is included in the investment equation to control for selection effects, under the assumption that the error terms of the two equations are jointly bivariate normal. In particular, the model specification is the following.

$$NSE_{it} = \gamma X_{it-1} + \theta_t + u_{it}$$

$$CAPEX_{it} = \alpha_i + \theta_t + \beta X_{it} + \delta_1 After_{it} + \delta_2 (After_{it} \times Constrained_i) + Mills_{it} + \varepsilon_{it} \tag{3.4}$$

Results of these tests are reported in Table 3.6. In column (1), results show that cross-listing had a positive and significant impact on the investment of financially constrained firms, even after controlling for selection effects in the cross-listing decision. Evidence in columns (2) and (3) shows that these results were more pronounced in NSE 95' dual-listed firms, in support of our previous findings.

3.5.3 Instrumental variables

Finally, we employ an instrumental variables model to investigate the impact of cross-listing on firm investment. Contrary to the treatment effects model presented above, this test assumes that the *After* dummy enters endogenously in the model because both firm investment and the cross-listing decision may be influenced by some common unobserved factor. To mitigate this concern, one has to identify a firm-level variable which relates to the cross-listing decision but would otherwise be uncorrelated with firm investment.

We propose and use the distance from a firm's headquarters to the primary market (BSE) as an instrument for the potentially endogenous decision to cross-list shares on the new market.[22] The motivation is based on prior research which uses firms' physical proximity to capital markets as an exogenous source of variation in firm opacity. For example, Saunders and Steffen (2011) use the distance of the firm to London capital markets as an identification variable to explore differences in borrowing costs between public and private companies.

The idea here is that in the presence of fragmented markets, firms geographically away from the BSE might have been facing disproportionately larger information asymmetry problems and market frictions (before the opening of the NSE). These problems may have reduced their ability to raise new capital or have contributed to raising capital more costly. The opening of the NSE, and in particular the adoption of electronic trading, might have helped these firms to overcome investment barriers, expand their shareholder base and gain from an improved information environment to a larger extent than their peers closer to the main market. Therefore, a firm's location with respect to the BSE was likely to affect its

[22] Prowess provides information for the address and postcode of sample firms' headquarters. We measure 'distance' as the geographical distance between a firm's postcode and the postcode of the BSE.

level of investment in the years after the opening of the NSE through the cross-listing decision.

To test the above arguments, we adopt an instrumental variables approach in which we first estimate the probability of going public on the NSE as a function of the firm's distance to the BSE. Then, we use the fitted values to explain the evolution of firm investment in the years after the opening of the NSE. In particular, our proposed model specification is the following.

$$NSE_{it} = (Distance_i \times Post94_t) + X_{it} + \alpha_i + \theta_t + \varepsilon_{it}$$

$$CAPEX_{it} = NSE_{it} + (NSE_{it} \times Constrained_i) + X_{it} + \alpha_i + \theta_t + \eta_{it} \tag{3.5}$$

In the model, *NSE* takes values one for firm-years after a firm becomes cross-listed on the new market and zero otherwise. *Distance* is the logarithm of the geographical distance between a firm's headquarters and the BSE location. *Post94* is a dummy variable which takes values one for years following the opening of the NSE (and zero before). As in previous tests, *CAPEX* is the level of firm investment, *Constrained* is an indicator taking values one if a firm was classified as financially constrained before the NSE opening by the Kaplan and Zingales (1997) index. *X* is a set of control variables presented in Section 3.1. This includes firms' assets, growth of sales, debt-to-asset ratios and firm profitability. Results of these tests are presented in Table 3.7.

Column (1) presents evidence from a probit model which explains the cross-listing decision as a function of the firm's distance to the BSE. It shows a positive and strongly statistically significant correlation between the two variables. This suggests that Indian firms were more likely to pursue a secondary listing on the NSE the further away they were positioned from the primary market (BSE). Column (2) explains firm investment as a function of the instrumented cross-listing variable. Consistent with our previous findings, results show that firms facing greater financial constraints were more likely to increase their levels of investment than their peers after cross-listing. Hence, deepening capital markets after the establishment of the new stockmarket enhanced firms' access to capital and alleviated financial constraints of domestic firms.

To address endogeneity, the use of 'distance' as an instrumental variable should satisfy two conditions: i) be uncorrelated with the error term in the outcome equation; and, ii) be correlated with the 'NSE' cross-listing variable (see first-stage results).

One way to check for independency of 'distance' is to estimate the residuals from the first-stage regression (ε) and include them as an additional control variable in the investment regression. If the respective coefficient is statistically not different from zero, then the cross-listing variable is not endogenous and hence our original equation can be estimated with an OLS regression. Column (3) which includes the first-stage residuals supports the view that the cross-listing variable enters endogenously in the model and a firm's proximity to the BSE may serve as an instrument for explaining firm investment in the NSE era. However, caution should be taken with inferences of these results as including control variables (firms' assets, growth of sales, debt and profitability) in the instrumental variables analysis weakens the role of geographical position as instrument (see columns (4) to (6)).

3.6 Additional tests

3.6.1 Variability within dual-listed firms

An implication of our results so far is that firms completing listing with a delay had financial attributes that matched more closely those of firms which the literature would describe as financially constrained. If so, we would expect to find differences in investment *within* the sample of dual-listed firms, with the investment of constrained firms growing larger the longer it took the firm to complete cross-listing on the NSE. To examine this hypothesis, we sort firms intro groups according to their listing date and compare their changes in investment after cross-listing.

In particular, we create three dummy variables taking values one for firms completing cross-listing within the first four-month period of 1995 (*Late1*), within the second (*Late2*) and within the third (*Late3*), and zero for firms which cross-listed in 1994.[23] We interact these dummies with the *After* variable and include an additional interaction term with the

[23] We use a four-month period to allow a balanced number of firms per period. As such, the number of firms per cohort is large enough to allow a good fit for model specifications.

constraints indicator *KZc* to capture differences in the investment of constrained firms. Results of these tests are presented in Table 3.8.

Column (1) compares the investment of the aggregate group of NSE 95' listing firms to firms of the NSE 94' listing cohort. In the remaining columns, we break the former group of companies into the subgroups presented above. Overall, results suggest that firms which completed listing within 1995 increased investment relatively more in the aftermath, and these differences grow larger the longer it took the firm to complete listing on the NSE. These results give rise to a positive relation between the time a firm took to enter the new market and the change in its subsequent investment. To the extent that this relation is associated with constraints faced by the firm when entering the new market (as implied by their financial characteristics), these findings support our inferences that the new market may have enhanced firms' access to capital and benefited relatively more financially constrained firms.

3.6.2 Exploring sources of relaxed constraints

Finally, this section sheds light on the possible channels through which cross-listing on the NSE may have enhanced firms' access to capital. Specifically, it studies capital and cost-of-capital implications on firm investment. First, it examines whether firms cross-listing on the new market issued more equity subsequently to cross-listing. Second, it examines whether dual-listed firms benefited from lower information asymmetries which reduced the cost of capital.

3.6.2.1 Increased access to equity capital

This section tests the hypothesis that increased investment in the aftermath of cross-listing was associated with enhanced access to capital in the form of equity financing. This should be more pronounced to firms in the NSE 95' listing cohort which our previous evidence associated with more pronounced changes in investment after cross-listing. To test this hypothesis, we perform our instrumental variables analysis by exploring the impact of cross-listing on new equity issues. Results of these tests are presented in Table 3.9.

Results in columns (1) and (2) show that cross listing had a positive influence on firms' equity offerings. These results were likely to apply to firms in the NSE 95' listing cohort, which represent more closely firms likely to have been financially constrained.

In the rest of the columns, we repeat tests this time studying the influence of cross-listing on new debt issues. Results provide only weak support that cross-listing enhanced firms' access to outside debt (e.g. through reputational effects). These findings suggest that cross-listing benefits associated with an increased ability of the firm to finance projects using new equity rather than with an overall improved access to outside funding after cross-listing. In sum, this section supports the view that firms cross-listing on the new market engaged with higher equity-financed investments and this was more pronounced to financially constrained firms.

3.6.2.2 Reduced information asymmetries

Theories suggest that firms cross-listing for the purpose of raising new capital would benefit from more informative stock prices and lower monitoring costs which reduce the cost of external finance (e.g. Karolyi, 2012). For example, stock markets which incorporate firm-specific information into stock prices allow investors to distinguish between firms with good and bad potential by examining their market-to-book ratios (e.g. Wurgler, 2000). Hence, better information production in the new market may have had a direct financing benefit to cross-listed firms in the form of a lower cost of capital. Other things equal, this should be more pronounced to firms with higher growth opportunities and firms with higher external financing needs.

However, advanced information and trading technology in the new market could also convey cross-listing benefits by allowing the firm to open up to a country-wide shareholder base, increase risk-sharing and enhance its stock liquidity. Hence, by cross-listing on the NSE, public firms could overcome entry barriers in previously fragmented markets which could translate into a more liquid trading environment for their stocks and a valuation premium over non-cross-listed firms.

To test these arguments, we propose three alternative measures to capture differences in firms' information environment. Specifically, we use the dispersion of annual earnings per share measured over the period 1991-1993, the variation in monthly stock returns in the period before the opening of the NSE (from March 1992 to October 1994) and the average ratio of intangible assets to total assets during the period 1991-1993. We use financial data before the opening of the NSE to mitigate endogeneity concerns with the cross-listing decision. As a result, firms are classified as 'opaque' if their respective values are above the industry median and 'non-opaque' otherwise.

The motivation for using these measures is based on previous studies which propose changes in stock returns and earnings-based measures to study changes in the information environment of the firm after cross-listing. For example, Fernades and Ferreira (2008) relate cross-listing in the U.S. to reduced stock return volatility. Similarly, Bailey et al. (2006) study changes in returns around earnings announcements to infer changes in the information environment of the firm. From a different perspective, the fraction of intangible assets held by the firm may correlate with its level of information asymmetry (e.g. Brown et al., 2009). The main idea here is that when a firm commits to increased levels of financial disclosure, it can reduce information costs borne by outside investors and increase the precision of the information available to investors. These developments can lower the firm's cost of capital.

Table 3.10 presents results from tests on corporate outcomes, after accounting for differences in firms' levels of information asymmetry. Specifically, results are presented in four different panels, with the outcome variables being firm investment estimated by capital expenditures (Panel A), cost of capital estimated by firms' monthly stock returns averaged over the year (Panel B), stock illiquidity estimated by the number of zero daily trading returns in BSE (Panel C) and stock valuation estimated by firms' market capitalization in BSE (Panel D). Results of these tests are presented for subsamples of firms based on their proximity to the BSE.

Evidence from Panel A1 shows that dual-listed firms increased investment relatively more after cross-listing. These results were more pronounced to firms which faced higher information asymmetries *ex-ante*. For example, column (1) shows that more 'opaque' firms increased investment by 2.3 percentage points more than their peers subsequently to cross-listing on the NSE. This evidence suggests that greater transparency in trading shares in the new market reduced firms' information asymmetries with implications on capital-raising. More detailed tests in Panel A2 show that these effects likely held for firms in both the NSE 94' and NSE 95' listing cohorts, in support of findings in Table 3.2.

Panel B examines changes in firms' (realized) stock returns as a proxy for changes in their cost of capital.[24] Evidence shows that cross-listing was associated with a reduction in the cost of capital. This was more pronounced to firms facing greater information problems *ex-ante*, regardless of their time of listing. This evidence can be explained by an information-based argument according to which, cross-listing allowed firms to overcome barriers to information flow and gain from a reduction in risk-premium required by investors for lesser-known firms (e.g. Merton, 1987).

Panel C examines whether reduced information asymmetries had any positive spill-over effects on the liquidity of firms' shares traded on the primary market (BSE). Results show that intermarket information linkages had positive implications on firms' trading environment in the primary market, consistent with existing theories (e.g. Domowitz et al., 1998). Specifically, firms with greater information asymmetry problems were likely to experience larger reductions in the stock illiquidity of their shares in the BSE. This evidence lends empirical support to our previous inferences that the opening of the NSE promoted greater equity market integration by reducing barriers to information flows.

Evidence from detailed tests in Panel C2 further shows that these results were likely to apply only to NSE 94' dual-listed firms. By contrast, NSE 95' firms did not experience significant improvements in liquidity conditions in the primary market, in support of results in Table 3.2. An explanation for this discrepancy is that cross-listing shares for the latter group of firms was accompanied by greater diversion of trading activity in the new market as a result of new equity offerings. Consistent with this view, Domowitz et al. (1998) argue that cross-listing increases liquidity in the home market as long as the benefit of getting access to a more 'liquid' market outweighs the disadvantage of migration of trading in the new market.

[24] We follow the literature in using realized (absolute) stock returns as a proxy for investors' expected stock returns (e.g. Errunza and Miller, 2000; Sarkissian and Schill, 2009).

Finally, results in Panel D show that the informational advantage of cross-listing was associated with a valuation premium in the primary market. However, these results were more pronounced in NSE 94' dual-listed firms. These firms expanded their shareholder base to include investors from across the country and benefit from lower trading costs, a lower cost of capital and increased stock valuation over non-cross-listed firms. These results are suggestive of the financial benefits of equity market integration at the firm level. On the contrary, the cross-listing premium was weak for firms that expanded their shareholder base to raise new capital but were not associated with persistent improvements in the stock liquidity of their shares in the primary market (i.e. NSE 95' firms). These findings suggest that equity market developments can create a valuation premium only through the channel of enhanced stock liquidity.

3.7 Conclusion

This paper explores the unique setting of firms cross-listing on a new domestic stock exchange as a means to enhancing their access to capital and overcoming market frictions in previously fragmented markets. The National Stock Exchange in India was the country's first stock exchange to adopt technological advances in trading and overcome geographical limits and market frictions in the primary market (Bombay Stock Exchange). Firms cross listing on the new market would benefit from a larger and deeper investor base, while investors could attain greater diversification options and lower transaction costs in trading.

Our empirical analysis shows that dual-listed firms increased investment relatively more than their peers which remained listed on the primary market. These results were more pronounced to firms which were more financially constrained *ex-ante* and are robust to testing for endogeneity in the cross-listing decision. They expand the prior literature by suggesting that equity market integration can improve firms' access to capital within the country's borders (e.g. Lins et al., 2005). Hence, financial market reforms which promote market integration can reduce incentives to pursue a cross-border listing and alleviate negative implications on home market liquidity conditions (e.g. Domowitz et al., 1998).

Evidence sheds light on possible sources of higher investment levels. In particular, dual-listed firms embarked on higher equity finance subsequently to cross-listing shares on the new market. Also, dual-listed firms benefited from lower information asymmetries and a reduced cost of capital, pertinent to the advanced information and trading technology in the new market.

However, results propose that valuation benefits in cross-listing were limited to firms which sustained improved trading conditions for shareholders. This finding is suggestive that equity market integration can improve firms' access to capital in emerging economies, but this may not be the most important benefit from shareholders' perspective.

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Figure 3.1 Cross-listings on the National Stock Exchange (NSE)

This figure provides information on the number of BSE-listed firms cross-listing on the NSE during the 1990s. The equities segment of NSE commenced operations in late 1994. More than 350 BSE-listed firms completed a secondary listing within the year of opening. The number of dual-listed firms increased more than twofold in 1995 and it dropped substantially the following years. Overall, almost 80% of all dual-listed firms cross-listed on the NSE within the first two years after its opening, i.e. in 1994 and 1995. Source: *Prowess*

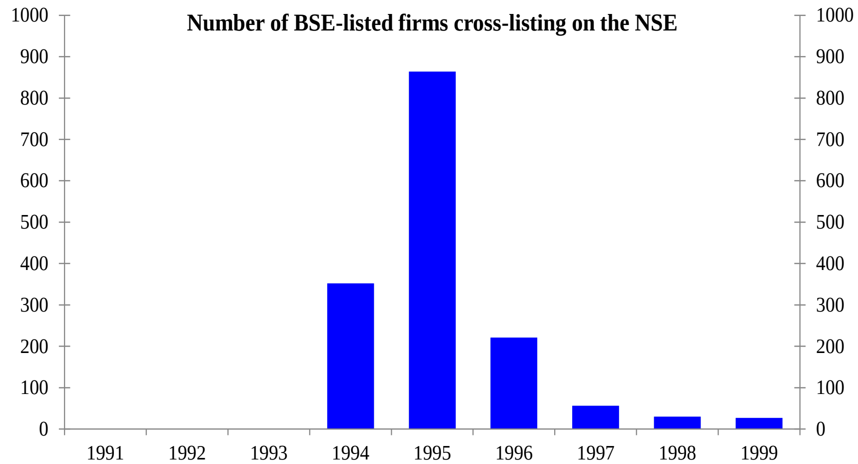

Figure 3.2 Evolution of firm investment around the cross-listing event

This figure plots point estimates (in percentage points) from regressions of firm investment (CAPEX) on time-event indicators taking values one before and after cross-listing on the new market (See equation (3.2)). Dual-listed firms are firms in the NSE 94' and NSE 95' listing cohorts. The regressions include firm fixed-effects and year dummies with standard errors clustered at the firm level. Dashed lines illustrate the 95th percentile confidence intervals.

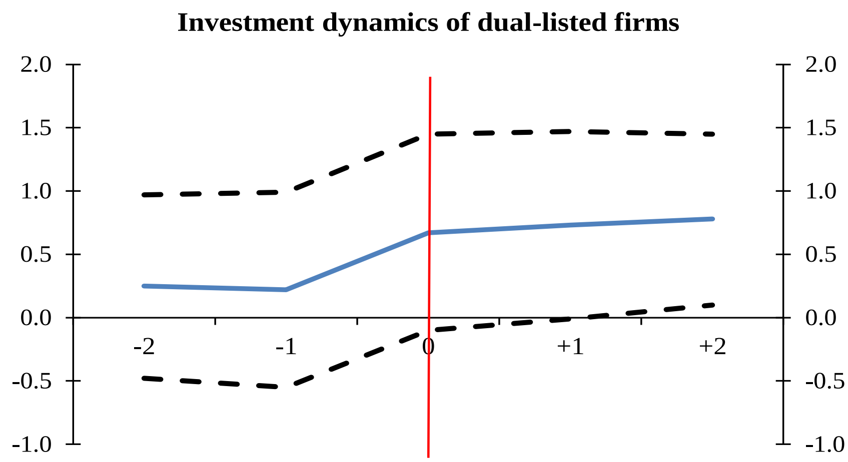

Table of Results

Table 3.1 Summary statistics

This Table presents summary statistics for the main variables included in multivariate tests. Tests on mean differences are presented for dual-listed firms before and after cross-listing shares on the new market (NSE), as well as against their peers which remained listed on the primary market (BSE). Definitions of all variables are provided in the Appendix (Annex 3.A).*,**,*** indicate significance at 10%, 5% and 1% respectively.

	NSE cross-listed firms			BSE-listed firms		
	Before	After	Diff.	All years	Diff.	Diff.
	(1)	(2)	(2) - (1)	(3)	(1) - (3)	(2) - (3)
Assets	8.082	8.721	0.639***	5.864	2.172***	3.016***
	[2.708]	[3.100]		[8.754]		
Sales Growth	0.160	0.025	-0.135***	0.021	0.068***	0.022***
	[1.802]	[2.891]		[6.013]		
FX Sales	7.865	9.375	1.510***	4.510	3.730***	4.911***
	[2.691]	[3.088]		[8.733]		
Leverage	0.419	0.408	-0.011**	0.448	-0.041***	-0.030***
	[2.681]	[3.070]		[8.157]		
PBITDA	0.151	0.125	-0.026***	0.100	0.039***	0.032***
	[2.665]	[3.096]		[8.611]		
CAPEX	0.068	0.046	-0.023***	0.032	0.025***	0.029***
	[1.895]	[3.042]		[6.365]		
ILLIQ_BSE	4.021	3.483	-0.538***	3.648	0.163***	0.051
	[2.604]	[3.347]		[11.514]		

Table 3.2 Parallel trends

This Table examines the evolution of firm investment (CAPEX) and stock liquidity in the primary market (ILLIQ_BSE) around the cross-listing event. The model in all specifications is a fixed-effects regression in which the variables of interest are regressed on event-year indicators, *Before2*, *Before1*, *After0*, *After1*, *After2* and *After3+*, controlling for firm fixed-effects and year dummies (See equation (3.2)). The indicators equal one for the firm-year observation *n*-years (*n* = 0, 1, 2, 3+) before or after the firm cross-lists on the NSE, and zero otherwise. Results are presented for all dual-listed firms and separately for the NSE94' and NSE 95' listing cohorts. Standard errors are corrected for heteroskedasticity and clustered at the firm level. P-values are depicted in parentheses with ***, **, * indicating statistical significance at 1%, 5% and 10% respectively.

	CAPEX			ILLIQ_BSE		
	NSE All	NSE 94'	NSE 95'	NSE All	NSE 94'	NSE 95'
	(1)	(2)	(3)	(4)	(5)	(6)
Before2	0.008		0.009	0.312***	0.248***	0.354***
	(0.100)		(0.124)	(0.000)	(0.000)	(0.000)
Before1	0.009	-0.001	0.011*	0.450***	0.442***	0.504***
	(0.122)	(0.931)	(0.069)	(0.000)	(0.000)	(0.000)
After0	0.013**	0.006	0.016***	0.415***	0.715***	0.248***
	(0.020)	(0.441)	(0.009)	(0.000)	(0.000)	(0.000)
After1	0.014**	0.010	0.015**	0.328***	0.360***	0.250***
	(0.017)	(0.137)	(0.019)	(0.000)	(0.000)	(0.000)
After2	0.015**	0.014*	0.014**	0.343***	0.124*	0.446***
	(0.012)	(0.055)	(0.029)	(0.000)	(0.089)	(0.000)
After3+	0.010*	0.005	0.007	0.227***	0.046	0.414***
	(0.094)	(0.453)	(0.222)	(0.003)	(0.601)	(0.000)
constant	0.049***	0.048***	0.047***	4.165***	4.188***	4.208***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm F.E.	X	X	X	X	X	X
Year F.E.	X	X	X	X	X	X
adj. R^2	0.093	0.096	0.093	0.146	0.137	0.125
Obs.	11,296	8,097	9,558	17,465	13,572	15,407

Table 3.3 Who goes public on the NSE?

This Table examines the *ex-ante* financial characteristics of firms cross-listing on the NSE. The dependent variable in all regressions is a dummy variable that takes values one if firm *i* cross-listed on the NSE in year *t* and zero otherwise (See equation (3.3)). Columns (1) and (3) present results from probit models. Columns (2) and (4) present results from Cox-proportional hazard models. Interaction terms are added in columns (3) and (4) to examine differences in cross-listing motives of firms in the NSE 95' listing cohort. Definitions of control variables are provided in the Appendix (Annex 3.A). Standard errors are clustered at the firm level and p-values are depicted in parentheses with ***, **, * indicating statistical significance at 1%, 5% and 10% respectively.

	(1)	(2)	(3)	(4)
$Assets_{t-1}$	0.463***	0.811***	0.510***	0.781***
	(0.000)	(0.000)	(0.000)	(0.000)
Age_t	-0.158***	-0.175***	-0.334***	-0.395***
	(0.000)	(0.000)	(0.000)	(0.000)
FX $Sales_{t-1}$	0.004**	0.010***	-0.001	0.010*
	(0.022)	(0.000)	(0.841)	(0.085)
Sales $Growth_{t-1}$	0.293***	0.075	-0.005	-0.246
	(0.007)	(0.501)	(0.978)	(0.265)
Industry $M2B_t$	0.680***	0.813***	2.876***	1.091***
	(0.000)	(0.000)	(0.000)	(0.000)
$PBITDA_{t-1}$	2.652***	4.857***	1.989**	4.895***
	(0.000)	(0.000)	(0.012)	(0.000)
Industry $Leverage_t$	0.833**	-0.038	0.697	-3.113***
	(0.037)	(0.937)	(0.376)	(0.004)
Group	0.273***	0.304***	0.523***	1.184***
	(0.000)	(0.000)	(0.000)	(0.000)
$ILLIQ\_BSE_{t-1}$	0.070***	0.145***	-0.253***	-0.169***
	(0.008)	(0.000)	(0.000)	(0.001)
DIV_dummy_{t-1}	0.256***	0.377***	0.532***	1.068***
	(0.000)	(0.000)	(0.000)	(0.000)
NSE 95 × $Assets_{t-1}$			0.117	-0.459***
			(0.150)	(0.000)
NSE 95 × Age_t			0.556***	0.530***
			(0.000)	(0.000)
NSE 95 × FX $Sales_{t-1}$			0.017***	-0.005
			(0.003)	(0.391)
NSE 95 × Sales $Growth_{t-1}$			0.753***	0.414*
			(0.009)	(0.082)
NSE 95 × Industry $M2B_t$			-5.980***	-1.259***
			(0.000)	(0.000)
NSE 95 × $PBITDA_{t-1}$			3.449***	-1.867
			(0.004)	(0.107)
NSE 95 × Industry $Leverage_t$			-2.170	4.330***
			(0.100)	(0.000)
NSE 95 × Group			-0.484***	-1.218***
			(0.002)	(0.000)
NSE 95 × $ILLIQ\_BSE_{t-1}$			1.611***	1.073***
			(0.000)	(0.000)
NSE 95 × DIV_dummy_{t-1}			-0.863***	-1.166***
			(0.000)	(0.000)
Year dummies	X		X	
pseudo R^2	0.271	0.096	0.527	0.120
Obs.	3,127	6,829	3,127	6,829

Table 3.4 Dual-listing on the NSE and firm investment

This Table presents results from regressing firms' capital investment (*CAPEX*) on firm financial characteristics, an indicator capturing years after cross-listing on the NSE (*After*) and its interaction term with a dummy variable identifying financially constrained firms (See equation (3.1)). *KZc*, *WWc* and *SAc* are indicators that take values one for firms classified as constrained before the opening of NSE (on year 1993) and zero otherwise, following the methodology proposed by Kaplan and Zingales (1997), Whited and Wu (2006) and Hadlock and Pierce (2010), respectively. Definitions of the indices are provided in the Appendix (Annex 3.B). Results are presented for dual-listed firms and their peers which remained listed on the BSE, as well as separately for the NSE 94' and NSE 95' listing cohorts. Definitions of control variables are provided in the Appendix (Annex 3.A). All specifications include firm fixed-effects and year dummies. P-values of tests on the statistical difference between the 'After' variable and its interaction terms are provided at the bottom of each Table. Standard errors are corrected for heteroskedasticity and clustered at the firm level. P-values are depicted in parentheses with ***, **, * indicating statistical significance at 1%, 5% and 10% respectively.

Panel A. Kaplan and Zingales (1997) index

	NSE All (1)	NSE 94' (2)	NSE 95' (3)
After	-0.011**	0.003	-0.020***
	(0.027)	(0.702)	(0.003)
After × KZc	0.011*	-0.007	0.022***
	(0.050)	(0.347)	(0.004)
Assets	0.029***	0.029***	0.031***
	(0.000)	(0.000)	(0.000)
Sales Growth	0.046***	0.045***	0.041***
	(0.000)	(0.000)	(0.000)
Leverage	-0.025***	-0.032***	-0.028***
	(0.005)	(0.002)	(0.003)
PBITDA	-0.033*	-0.045**	-0.030*
	(0.058)	(0.028)	(0.096)
constant	-0.154***	-0.144***	-0.159***
	(0.000)	(0.000)	(0.000)
Firm F.E.	X	X	X
Year F.E.	X	X	X
adj. R^2	0.129	0.133	0.131
Obs.	7,144	5,024	5,969
p-value	0.027	0.455	0.002

Panel B. Whited-Wu (2006) index and Hadlock and Pierce (2010) index

	NSE All (1)	NSE 94' (2)	NSE 95' (3)	NSE All (4)	NSE 94' (5)	NSE 95' (6)
After	0.000	0.002	-0.003	-0.002	-0.003	-0.001
	(0.989)	(0.776)	(0.707)	(0.653)	(0.523)	(0.870)
After × WWc	-0.003	-0.005	-0.001			
	(0.559)	(0.455)	(0.914)			
After × SAc				-0.015	-0.015	-0.016
				(0.169)	(0.200)	(0.323)
Assets	0.028***	0.029***	0.030***	0.032***	0.030***	0.035***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Sales Growth	0.046***	0.044***	0.043***	0.046***	0.044***	0.044***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	-0.023***	-0.027***	-0.029***	-0.031***	-0.038***	-0.032***
	(0.008)	(0.006)	(0.002)	(0.002)	(0.001)	(0.002)
PBITDA	-0.026	-0.035*	-0.021	-0.040**	-0.050**	-0.027
	(0.130)	(0.077)	(0.240)	(0.031)	(0.018)	(0.161)
constant	-0.145***	-0.138***	-0.149***	-0.168***	-0.138***	-0.178***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm F.E.	X	X	X	X	X	X
Year F.E.	X	X	X	X	X	X
adj. R^2	0.125	0.128	0.128	0.132	0.133	0.137
Obs.	8,382	5,960	6,972	6,900	4,853	5,815
p-value	0.737	0.555	0.896	0.258	0.405	0.374

Table 3.5 Propensity score matching

This Table compares differences in investment of dual-listed firms to those of matched firms which remained listed in the primary market (BSE). Firms are matched using propensity score matching. Section (3.5.1) presents details of the matching methods. Results are presented for dual-listed firms against their matched firms, and separately for the NSE 94' and NSE 95' listing cohorts. For each test, changes in investment are reported for treated (dual-listed), non-treated (benchmark) and control (matched benchmark) group of firms.

NSE All	**Before**	**After**	**Diff.**
Treated firms (Dual-listed)	0.067	0.038	-0.029
Non-treated firms (BSE-listed)	0.046	0.009	-0.037
Difference	0.021	0.029	0.008
(t-value)	(14.11)	(25.91)	(4.89)
Treated firms (Dual-listed matched)	0.066	0.036	-0.030
Control firms (BSE-listed matched)	0.050	0.008	-0.042
Difference	0.016	0.028	0.012
(t-value)	(2.45)	(5.74)	(1.73)

NSE 94'	**Before**	**After**	**Diff.**
Treated firms (Dual-listed)	0.071	0.044	-0.027
Non-treated firms (BSE-listed)	0.047	0.009	-0.037
Difference	0.025	0.035	0.010
(t-value)	(12.01)	(24.12)	(4.69)
Treated firms (Dual-listed matched)	0.071	0.043	-0.028
Control firms (BSE-listed matched)	0.028	-0.007	-0.035
Difference	0.043	0.050	0.007
(t-value)	(4.22)	(6.60)	(0.69)

NSE 95'	**Before**	**After**	**Diff.**
Treated firms (Dual-listed)	0.065	0.035	-0.030
Non-treated firms (BSE-listed)	0.047	0.009	-0.037
Difference	0.019	0.026	0.007
(t-value)	(11.17)	(20.13)	(3.62)
Treated firms (Dual-listed matched)	0.065	0.035	-0.030
Control firms (BSE-listed matched)	0.067	0.026	-0.040
Difference	-0.002	0.008	0.010
(t-value)	(0.45)	(2.83)	(2.34)

Table 3.6 Treatment effects

This Table examines cross-listing benefits on firm investment, after controlling for the potential selection bias in the cross-listing decision. The dependent variable in all regressions is firms' capital investment (*CAPEX*). *After* is a dummy variable which takes values one for firm-years after cross-listing on the NSE and zero otherwise. The financial constraints indicator (*KZc*) takes values one if the index value of the firm proposed by Kaplan and Zingales (1997) belongs to the top tercile, and zero if it belongs to the bottom tercile. Details on the construction of the index are provided in the Appendix (Annex 3.B). All specifications include the inverse Mills ratio derived from a first-stage regression which explains the cross-listing decision. Results of first-stage regressions are presented in the Appendix (Annex 3.C). Results are presented for dual-listed firms, and separately for firms in the NSE 94' and NSE 95' listing cohorts. Definitions of control variables are provided in the Appendix (Annex 3.A). P-values of tests on statistical differences of the *After* variable and its interaction term are provided at the bottom of the Table. Standard errors are corrected for heteroskedasticity and clustered at the firm level. P-values are depicted in parentheses with ***, **, * indicating statistical significance at 1%, 5% and 10% respectively.

	All NSE vs. BSE	NSE 94' vs. BSE	NSE 95' vs. BSE
	(1)	(2)	(3)
After	-0.021***	-0.008	-0.029***
	(0.000)	(0.269)	(0.000)
After × KZc	0.017***	-0.004	0.029***
	(0.004)	(0.648)	(0.000)
Mills	0.018***	0.016***	0.026***
	(0.000)	(0.000)	(0.000)
Assets	0.047***	0.044***	0.057***
	(0.000)	(0.000)	(0.000)
Sales Growth	0.036***	0.035***	0.028***
	(0.000)	(0.000)	(0.000)
Leverage	-0.013	-0.024**	-0.011
	(0.203)	(0.049)	(0.299)
PBITDA	-0.024	-0.031	-0.012
	(0.206)	(0.152)	(0.545)
constant	-0.305***	-0.274***	-0.371***
	(0.000)	(0.000)	(0.000)
Firm F.E.	X	X	X
Year F.E.	X	X	X
adj. R^2	0.146	0.146	0.158
Obs.	5,786	4,024	4,797
p-value	0.000	0.778	0.000

Table 3.7 Instrumental variables

This Table presents results from an instrumental variable analysis which uses the proximity to the primary listing venue (BSE) as an instrument for cross-listing on the NSE (see equation (3.5)). Column (1) reports results from a probit model in which the dependent variable identifies firm-years after which the firm is dual-listed on the NSE. *Distance* is the geographical distance between the firm and the location of the BSE. *Post94* is an indicator taking values one for years after 1994 (i.e. the opening year of the NSE). Column (2) reports results on the outcome regression as a function of the instrumented cross-listing variable. *KZc* is an indicator variable which identifies firms classified by the Kaplan and Zingales (1997) index as financially constrained (See Annex 3.B). Column (3) presents robustness tests on independency by including the residuals from the 1st stage as an additional control variable in the structural equation. Columns (4) to (6) repeat the aforementioned tests in the same order, this time including control variables related to firm investment. Definitions of these variables are provided in the Appendix (Annex 3.A). P-values of standard errors clustered at the firm level are depicted in parentheses with ***, **, * indicating statistical significance at 1%, 5% and 10% respectively.

	NSE (1)	CAPEX (2)	CAPEX (3)	NSE (4)	CAPEX (5)	CAPEX (6)
NSE		-0.041	-0.016**		-0.030***	-0.019
		(0.376)	(0.045)		(0.005)	(0.163)
NSE × KZc		0.069***	0.020**		0.057***	0.027***
		(0.001)	(0.033)		(0.000)	(0.004)
Assets				1.338***	0.029***	0.042***
				(0.000)	(0.000)	(0.000)
Sales Growth				-0.532***	0.047***	0.040***
				(0.000)	(0.000)	(0.000)
Leverage				-0.773***	-0.020*	0.001
				(0.001)	(0.071)	(0.952)
PBITDA				3.150***	-0.045**	-0.048*
				(0.000)	(0.034)	(0.051)
Distance × Post94	0.065***			0.005		
	(0.000)			(0.804)		
1st stage Residuals			0.006***			-0.001
			(0.005)			(0.931)
constant	-0.695***	0.050***	0.052***	-9.901***	-0.162***	-0.260***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm F.E.		X	X		X	X
Year dummies	X	X	X	X	X	X
pseudo or adj. R^2	0.048	0.094	0.095	0.627	0.129	0.137
Obs.	10,130	5,234	5,234	7,335	5,682	4,854

Table 3.8 Variability within dual-listed firms

This Table examines how relaxed financial constraints related to the timing of cross-listing on the new market. The dependent variable is firms' capital investment (*CAPEX*). *After* takes values one for years after cross-listing on the new market and zero otherwise. The financial constraints indicator (KZc) identifies firms classified by the Kaplan and Zingales (1997) index as financially constrained. Details on the construction of the index are provided in the Appendix (Annex 3.B). *Late* takes values one for firms cross-listing on the NSE in 1995 and zero for firms cross-listing in 1994. *Late1* takes values one for firms cross-listing during the first four-month period of 1995 and zero for firms cross-listing in 1994. *Late2* takes values one for firms cross-listing during the second four-month period in 1995 and zero for firms cross-listing in 1994. *Late3* takes values one for firms cross-listing during the third four-month period in 1995 and zero for firms cross-listing in 1994. All specifications include control variables (defined in the Appendix, Annex 3.A), firm fixed effects and year dummies. Standard errors are corrected for heteroskedasticity and clustered at the firm level. P-values are depicted in parentheses with ***, **, * indicating statistical significance at 1%, 5% and 10% respectively.

	(1)	(2)	(3)	(4)
After × KZc	-0.008	-0.008	-0.008	-0.008
	(0.229)	(0.257)	(0.216)	(0.287)
After × Late	-0.021***			
	(0.009)			
After × Late × KZc	0.030***			
	(0.002)			
After × Late1		-0.007		
		(0.494)		
After × Late1 × KZc		0.015		
		(0.248)		
After × Late2			-0.030***	
			(0.005)	
After × Late2 × KZc			0.039***	
			(0.004)	
After × Late3				-0.030**
				(0.035)
After × Late3 × KZc				0.043**
				(0.019)
Assets	0.026***	0.017***	0.027***	0.026***
	(0.000)	(0.001)	(0.000)	(0.000)
Sales Growth	0.056***	0.068***	0.059***	0.066***
	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	-0.002	0.013	-0.012	-0.001
	(0.893)	(0.511)	(0.507)	(0.978)
PBITDA	-0.015	-0.040	-0.010	-0.040
	(0.612)	(0.332)	(0.798)	(0.448)
constant	-0.163***	-0.097**	-0.165***	-0.167***
	(0.000)	(0.034)	(0.000)	(0.008)
Firm F.E.	X	X	X	X
Year F.E.	X	X	X	X
adj. R^2	0.124	0.121	0.132	0.133
Obs.	3,295	2,041	2,092	1,512
After × KZc = After × Late × KZc	0.011	0.186	0.008	0.024
After × Late = After × Late × KZc	0.002	0.321	0.002	0.016

Table 3.9 External financing

This Table examines cross-listing implications on new equity and debt offerings of dual-listed firms. Figures depicted stem from an instrumental variables model which uses firm proximity to the primary listing venue (BSE) as an instrument for the cross-listing dummy. Models (1) and (2) present results for new equity offerings. Models (3) and (4) present results for new debt offerings. NSE 95' is an indicator taking values one for firms which cross-listed on the BSE in 1995, and zero for their peers which remained listed on the BSE. Similarly, NSE 94' is an indicator taking values one for firms which cross-listed on the BSE in 1994, and zero for their peers which remained listed on the BSE. Definitions of control variables are provided in the Appendix (Annex 3.A). Diagnostic tests on endogeneity are reported at the bottom of the Table. P-values of standard errors are depicted in parentheses with ***, **, * indicating statistical significance at 1%, 5% and 10% respectively.

	Equity issues		Debt issues	
	(1)	(2)	(3)	(4)
NSE 95'	0.049***		0.025*	
	(0.004)		(0.089)	
NSE 94'		-0.061***		-0.030*
		(0.002)		(0.080)
Assets	-0.005***	0.006	-0.002*	0.004
	(0.000)	(0.125)	(0.051)	(0.140)
Age	0.003*	0.001	0.002*	0.001
	(0.071)	(0.488)	(0.088)	(0.355)
FX Sales	-0.001***	-0.000***	-0.000	0.000
	(0.000)	(0.000)	(0.751)	(0.262)
Industry M2B	0.049***	0.045***	0.019***	0.016***
	(0.000)	(0.000)	(0.000)	(0.000)
Sales Growth	0.007*	0.006	0.007**	0.005*
	(0.060)	(0.118)	(0.013)	(0.058)
Industry Leverage	0.002	-0.002	0.010	0.008
	(0.910)	(0.927)	(0.416)	(0.531)
PBITDA	-0.003	0.037**	-0.003	0.021
	(0.868)	(0.018)	(0.802)	(0.128)
Group	-0.008**	-0.003	-0.005*	-0.002
	(0.017)	(0.172)	(0.063)	(0.195)
Constant	-0.047***	-0.099***	-0.030***	-0.057***
	(0.000)	(0.000)	(0.001)	(0.005)
Weak instrument (F-test)	42.79***	54.92***	36.93***	53.45***
Endogenous (p-value)	0.003	0.011	0.027	0.035
Obs.	3,005	3,005	3,493	3,493

Table 3.10 Informational advantages of cross-listing

This Table explores the role of firms' information environment in corporate outcomes following the cross-listing decision. Panel A tests implications of cross-listing on firms' capital investment (CAPEX). Panel B presents results on firms' cost of equity capital proxied by the natural logarithm of (realized) monthly stock returns in BSE averaged over the year. Panel C presents results on firms' stock liquidity measured as the natural logarithm of one plus the number of zero trading days in BSE over the year. Panel D tracks down firms' stock valuation measured by the natural logarithm of firms' market capitalization on BSE. All panels are presented in subsamples based on firms' proximity to the primary market. Firm opacity is proxied based on the dispersion of annual earnings per share for the period 1991-3 (column 1), the variation in monthly stock returns for the period March 1992 to October 1994 (column 2), and the average ratio of intangible to total assets for the period 1991-3 (column 3). Firms are denoted as 'opaque' if their values of the respective measures are above the industry median and 'non-opaque' otherwise. *LateAfter* is a dummy variable taking values one for years after 1995 and zero for years before 1994. Definitions of the rest of control variables are provided in the Appendix (Annex 3.A). Standard errors are corrected for heteroskedasticity and are clustered at the firm level. P-values are depicted in parentheses with ***, **, * indicating statistical significance at 1%, 5% and 10% respectively.

Panel A. Capital expenditures

PANEL A1	Distance > Sample median			Distance < Sample median		
	(1)	(2)	(3)	(4)	(5)	(6)
LateAfter	-0.009	-0.004	-0.026***	-0.041***	-0.029***	-0.060***
	(0.104)	(0.422)	(0.000)	(0.000)	(0.000)	(0.000)
LateAfter × opaque$_{(1)}$	-0.008	-0.016**	0.026***	0.005	-0.022***	0.042***
	(0.220)	(0.016)	(0.000)	(0.522)	(0.007)	(0.000)
LateAfter × NSE × opaque$_{(2)}$	0.023***	-0.003	0.013**	-0.006	-0.010	-0.013**
	(0.009)	(0.833)	(0.041)	(0.538)	(0.638)	(0.049)
LateAfter × NSE × non-opaque$_{(3)}$	0.009	0.009	0.016**	0.001	-0.010	0.009
	(0.118)	(0.120)	(0.027)	(0.928)	(0.139)	(0.365)
Sales Growth	0.051***	0.050***	0.050***	0.055***	0.054***	0.054***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Industry Sales Growth	-0.030*	-0.029*	-0.027*	-0.026	-0.023	-0.016
	(0.067)	(0.079)	(0.090)	(0.305)	(0.335)	(0.513)
constant	0.043***	0.043***	0.042***	0.039***	0.040***	0.039***
adj. R^2	0.138	0.141	0.148	0.151	0.155	0.167
Firm & Year F.E.	X	X	X	X	X	X
Obs.	4,036	4,043	4,043	2,932	2,940	2,949
(1) = (2)	0.021	0.377	0.203	0.480	0.627	0.000
(2) = (3)	0.185	0.385	0.726	0.591	0.988	0.067

PANEL A2	Distance > Sample median			Distance < Sample median		
	(1)	(2)	(3)	(4)	(5)	(6)
LateAfter	-0.009	-0.004	-0.026***	-0.041***	-0.029***	-0.060***
	(0.103)	(0.422)	(0.000)	(0.000)	(0.000)	(0.000)
LateAfter × opaque$_{(0)}$	-0.008	-0.016**	0.026***	0.005	-0.022***	0.042***
	(0.219)	(0.016)	(0.000)	(0.521)	(0.007)	(0.000)
LateAfter × NSE94 × opaque$_{(1)}$	0.012	0.034***	0.016**	-0.003	0.005	-0.013
	(0.357)	(0.000)	(0.034)	(0.805)	(0.713)	(0.109)
LateAfter × NSE95 × opaque$_{(2)}$	0.028***	-0.005	0.011	-0.008	-0.012	-0.012
	(0.005)	(0.689)	(0.128)	(0.466)	(0.606)	(0.112)
LateAfter × NSE94 × non-opaque$_{(3)}$	0.008	0.002	0.004	0.009	-0.005	0.024*
	(0.335)	(0.797)	(0.699)	(0.338)	(0.517)	(0.051)
LateAfter × NSE95 × non-opaque$_{(4)}$	0.010	0.012**	0.021***	-0.005	-0.014*	0.000
	(0.136)	(0.049)	(0.007)	(0.581)	(0.076)	(0.980)
Sales Growth	0.051***	0.050***	0.050***	0.055***	0.053***	0.054***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Industry Sales Growth	-0.031*	-0.029*	-0.030*	-0.025	-0.023	-0.017
	(0.060)	(0.075)	(0.064)	(0.307)	(0.327)	(0.484)
constant	0.043***	0.043***	0.043***	0.040***	0.040***	0.039***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
adj. R^2	0.138	0.142	0.148	0.151	0.155	0.169
Firm & Year F.E.	X	X	X	X	X	X
Obs.	4,036	4,043	4,043	2,932	2,940	2,949
(0) = (1)	0.220	0.000	0.396	0.629	0.148	0.000
(0) = (2)	0.011	0.481	0.179	0.421	0.732	0.000
(1) = (2)	0.296	0.000	0.537	0.656	0.508	0.897
(3) = (4)	0.826	0.174	0.137	0.196	0.277	0.101
(1) = (3)	0.766	0.000	0.364	0.418	0.525	0.012
(2) = (4)	0.121	0.211	0.335	0.811	0.942	0.382

Panel B. Cost of capital

PANEL B1	Distance > Sample median			Distance < Sample median		
	(1)	(2)	(3)	(4)	(5)	(6)
LateAfter	-0.051	-0.209	0.798***	0.245	-0.172	0.430
	(0.773)	(0.205)	(0.000)	(0.270)	(0.440)	(0.116)
LateAfter × opaque$_{(1)}$	0.182	0.510**	0.182	0.007	0.745**	-0.338
	(0.413)	(0.024)	(0.420)	(0.983)	(0.011)	(0.265)
LateAfter × NSE × opaque$_{(2)}$	-1.340***	-0.408	-0.857***	-0.880***	-0.234	-0.709***
	(0.000)	(0.276)	(0.000)	(0.004)	(0.630)	(0.003)
LateAfter × NSE × non-opaque$_{(3)}$	-0.584***	-0.657***	-0.789***	-0.800***	-0.509**	-0.926***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.021)	(0.002)
Sales Growth	-0.130	-0.053	-0.114	-0.458**	-0.406**	-0.454**
	(0.359)	(0.713)	(0.426)	(0.013)	(0.028)	(0.013)
Industry Sales Growth	-0.293	-0.204	-0.213	0.320	-0.015	0.363
	(0.545)	(0.672)	(0.657)	(0.660)	(0.982)	(0.597)
constant	0.410***	0.383***	0.401***	0.228**	0.250**	0.230**
adj. R^2	(0.000)	(0.000)	(0.000)	(0.037)	(0.018)	(0.033)
Firm & Year F.E.	0.096	0.100	0.092	0.060	0.076	0.062
Obs.	X	X	X	X	X	X
(1) = (2)	2,027	2,030	2,033	1,463	1,468	1,471
(2) = (3)	0.000	0.071	0.004	0.101	0.130	0.424

PANEL B2	Distance > Sample median			Distance < Sample median		
	(1)	(2)	(3)	(4)	(5)	(6)
LateAfter	-0.054	-0.213	0.810***	0.245	-0.158	0.432
	(0.761)	(0.198)	(0.000)	(0.271)	(0.479)	(0.114)
LateAfter × opaque$_{(0)}$	0.183	0.511**	0.181	0.006	0.743**	-0.338
	(0.412)	(0.023)	(0.423)	(0.983)	(0.011)	(0.265)
LateAfter × NSE94 × opaque$_{(1)}$	-1.679***	-0.352	-1.133***	-0.818**	-1.473***	-0.654**
	(0.000)	(0.108)	(0.000)	(0.037)	(0.001)	(0.012)
LateAfter × NSE95 × opaque$_{(2)}$	-1.174***	-0.415	-0.707***	-0.942***	-0.150	-0.760**
	(0.000)	(0.304)	(0.002)	(0.006)	(0.765)	(0.011)
LateAfter × NSE94 × non-opaque$_{(3)}$	-0.811***	-0.843***	-0.981***	-0.807***	-0.422*	-0.965**
	(0.000)	(0.000)	(0.001)	(0.002)	(0.089)	(0.023)
LateAfter × NSE95 × non-opaque$_{(4)}$	-0.454**	-0.538***	-0.685***	-0.796***	-0.581**	-0.907***
	(0.024)	(0.002)	(0.003)	(0.004)	(0.021)	(0.006)
Sales Growth	-0.122	-0.050	-0.105	-0.457**	-0.402**	-0.450**
	(0.392)	(0.729)	(0.462)	(0.013)	(0.030)	(0.014)
Industry Sales Growth	-0.313	-0.222	-0.208	0.314	0.119	0.372
	(0.520)	(0.647)	(0.664)	(0.667)	(0.868)	(0.588)
constant	0.401***	0.379***	0.393***	0.229**	0.248**	0.230**
	(0.000)	(0.000)	(0.000)	(0.036)	(0.019)	(0.033)
adj. R^2	0.099	0.102	0.094	0.059	0.076	0.060
Firm & Year F.E.	X	X	X	X	X	X
Obs.	2,027	2,030	2,033	1,463	1,468	1,471
(0) = (1)	0.000	0.037	0.000	0.165	0.000	0.506
(0) = (2)	0.001	0.081	0.018	0.089	0.176	0.396
(1) = (2)	0.123	0.869	0.116	0.757	0.018	0.720
(3) = (4)	0.115	0.112	0.266	0.967	0.502	0.887
(1) = (3)	0.024	0.093	0.685	0.982	0.039	0.531
(2) = (4)	0.030	0.779	0.948	0.739	0.441	0.738

Panel C. Stock liquidity (BSE)

PANEL C1	Distance > Sample median			Distance < Sample median		
	(1)	(2)	(3)	(4)	(5)	(6)
LateAfter	-0.221**	-0.187*	-0.050	-0.604***	-0.993***	-0.674***
	(0.032)	(0.071)	(0.600)	(0.000)	(0.000)	(0.000)
LateAfter × opaque(1)	0.190	0.046	-0.191	-0.229	0.684***	-0.005
	(0.193)	(0.748)	(0.168)	(0.240)	(0.000)	(0.978)
LateAfter × NSE × opaque(2)	-0.448***	0.067	-0.208*	-0.272	-0.440**	-0.455***
	(0.001)	(0.716)	(0.086)	(0.102)	(0.038)	(0.003)
LateAfter × NSE × non-opaque(3)	-0.243**	-0.328***	-0.436***	-0.456***	-0.099	-0.326**
	(0.013)	(0.001)	(0.000)	(0.001)	(0.492)	(0.019)
Sales Growth	-0.120*	-0.116*	-0.120*	-0.007	0.037	-0.008
	(0.069)	(0.081)	(0.070)	(0.928)	(0.660)	(0.919)
Industry Sales Growth	0.161	0.113	0.149	-0.277	-0.359	-0.306
	(0.516)	(0.651)	(0.550)	(0.510)	(0.354)	(0.431)
constant	3.832***	3.843***	3.840***	3.874***	3.839***	3.861***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
adj. R^2	0.150	0.152	0.150	0.150	0.164	0.148
Firm & Year F.E.	X	X	X	X	X	X
Obs.	4,080	4,086	4,086	3,017	3,025	3,033
(1) = (2)	0.013	0.939	0.944	0.897	0.001	0.151
(2) = (3)	0.218	0.060	0.141	0.384	0.181	0.525

PANEL C2	Distance > Sample median			Distance < Sample median		
	(1)	(2)	(3)	(4)	(5)	(6)
LateAfter	-0.220**	-0.188*	-0.048	-0.597***	-0.988***	-0.668***
	(0.032)	(0.070)	(0.617)	(0.000)	(0.000)	(0.000)
LateAfter × opaque(0)	0.190	0.046	-0.191	-0.229	0.685***	-0.006
	(0.193)	(0.746)	(0.168)	(0.241)	(0.000)	(0.976)
LateAfter × NSE94 × opaque(1)	-0.809***	-0.443***	-0.612***	-0.569***	-0.978**	-0.687***
	(0.000)	(0.007)	(0.000)	(0.002)	(0.019)	(0.000)
LateAfter × NSE95 × opaque(2)	-0.274*	0.100	-0.026	-0.008	-0.349	-0.244
	(0.051)	(0.601)	(0.836)	(0.963)	(0.103)	(0.118)
LateAfter × NSE94 × non-opaque(3)	-0.563***	-0.622***	-0.698***	-0.718***	-0.356**	-0.655***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.019)	(0.000)
LateAfter × NSE95 × non-opaque(4)	-0.101	-0.176*	-0.316***	-0.281**	0.111	-0.134
	(0.321)	(0.080)	(0.002)	(0.033)	(0.442)	(0.329)
Sales Growth	-0.113*	-0.111*	-0.111*	0.001	0.044	0.001
	(0.086)	(0.094)	(0.092)	(0.991)	(0.591)	(0.994)
Industry Sales Growth	0.137	0.086	0.142	-0.267	-0.345	-0.301
	(0.576)	(0.728)	(0.563)	(0.524)	(0.371)	(0.439)
constant	3.829***	3.842***	3.837***	3.866***	3.832***	3.854***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
adj. R^2	0.158	0.159	0.158	0.157	0.170	0.154
Firm & Year F.E.	X	X	X	X	X	X
Obs.	4,080	4,086	4,086	3,017	3,025	3,033
(0) = (1)	0.000	0.069	0.088	0.319	0.000	0.033
(0) = (2)	0.075	0.850	0.492	0.512	0.002	0.451
(1) = (2)	0.000	0.007	0.000	0.000	0.146	0.000
(3) = (4)	0.000	0.000	0.000	0.000	0.000	0.000
(1) = (3)	0.195	0.365	0.628	0.521	0.161	0.888
(2) = (4)	0.314	0.200	0.070	0.208	0.075	0.597

Panel D. Market Capitalization (BSE)

PANEL D1	Distance > Sample median			Distance < Sample median		
	(1)	(2)	(3)	(4)	(5)	(6)
LateAfter	-0.872***	-0.716***	-0.975***	-0.858***	-0.503***	-1.176***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LateAfter × opaque$_{(1)}$	-0.086	-0.408***	0.139	0.038	-0.743***	0.574***
	(0.481)	(0.000)	(0.208)	(0.838)	(0.000)	(0.001)
LateAfter × NSE × opaque$_{(2)}$	0.267*	-0.311*	0.206*	0.079	-0.107	-0.169
	(0.052)	(0.086)	(0.061)	(0.665)	(0.795)	(0.268)
LateAfter × NSE × non-opaque$_{(3)}$	0.238***	0.139	0.275***	0.024	-0.267*	0.328**
	(0.009)	(0.144)	(0.007)	(0.855)	(0.052)	(0.017)
Sales Growth	0.307***	0.275***	0.294***	0.425***	0.374***	0.419***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Industry Sales Growth	0.968***	0.945***	0.989***	0.309	0.366	0.301
	(0.000)	(0.000)	(0.000)	(0.364)	(0.257)	(0.356)
constant	6.160***	6.169***	6.160***	5.961***	5.979***	5.965***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
adj. R^2	0.421	0.439	0.426	0.361	0.384	0.375
Firm & Year F.E.	X	X	X	X	X	X
Obs.	3,986	3,990	3,991	2,856	2,863	2,868
(1) = (2)	0.130	0.683	0.730	0.905	0.176	0.011
(2) = (3)	0.858	0.028	0.649	0.806	0.711	0.015

PANEL D2	Distance > Sample median			Distance < Sample median		
	(1)	(2)	(3)	(4)	(5)	(6)
LateAfter	-0.872***	-0.715***	-0.980***	-0.858***	-0.508***	-1.179***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LateAfter × opaque$_{(0)}$	-0.086	-0.408***	0.139	0.038	-0.744***	0.574***
	(0.481)	(0.000)	(0.207)	(0.838)	(0.000)	(0.001)
LateAfter × NSE94 × opaque$_{(1)}$	0.424**	1.351***	0.473***	0.029	2.074***	-0.052
	(0.025)	(0.000)	(0.002)	(0.889)	(0.007)	(0.761)
LateAfter × NSE95 × opaque$_{(2)}$	0.192	-0.418**	0.087	0.122	-0.475	-0.275
	(0.205)	(0.017)	(0.466)	(0.554)	(0.195)	(0.112)
LateAfter × NSE94 × non-opaque$_{(3)}$	0.347***	0.164	0.259*	0.267	-0.205	0.450**
	(0.007)	(0.174)	(0.060)	(0.108)	(0.185)	(0.026)
LateAfter × NSE95 × non-opaque$_{(4)}$	0.189*	0.125	0.282**	-0.139	-0.318**	0.258*
	(0.062)	(0.222)	(0.015)	(0.321)	(0.030)	(0.080)
Sales Growth	0.304***	0.268***	0.289***	0.416***	0.366***	0.416***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Industry Sales Growth	0.978***	0.963***	0.963***	0.325	0.357	0.297
	(0.000)	(0.000)	(0.000)	(0.335)	(0.269)	(0.363)
constant	6.161***	6.170***	6.163***	5.962***	5.983***	5.969***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
adj. R^2	0.422	0.442	0.429	0.365	0.391	0.376
Firm & Year F.E.	X	X	X	X	X	X
Obs.	3,986	3,990	3,991	2,856	2,863	2868
(0) = (1)	0.060	0.000	0.131	0.979	0.000	0.037
(0) = (2)	0.250	0.968	0.795	0.811	0.533	0.005
(1) = (2)	0.233	0.000	0.012	0.632	0.002	0.153
(3) = (4)	0.239	0.730	0.875	0.011	0.351	0.352
(1) = (3)	0.735	0.000	0.297	0.368	0.003	0.057
(2) = (4)	0.987	0.007	0.241	0.294	0.689	0.019

Appendix to Chapter 3

Annex 3.A Variables definition

VARIABLE	DEFINITION (Source: Prowess)
Age	Ln(Number of years since incorporation)
Assets	Ln(Assets)
CAPEX	Change in net fixed assets to Assets
Debt issues	Net debt issues/ Assets
Distance	Ln(1+geographical distance to the BSE)
DIV_dummy	Indicator taking values on for firms affiliated with business groups
Equity issues	Net equity issues/ Assets
FX Sales	Foreign sales/Total sales
Group	Indicator taking values one if firm paid a dividend on that year
ILLIQ_BSE	Ln(1+number of zero daily returns), based on BSE data
Industry Leverage	Median debt-to-assets (Leverage) of firm's industry
Industry M2B	Median market-to-book ratio (M2B) of firm's industry
Industry Sales Growth	Median sales growth (Sales Growth) of firm's industry
Leverage	Debt/ Assets
M2B	(Assets + Market capitalization – Net worth)/Assets
PBITDA	Earnings before interest, taxes and depreciation/ Assets
Sales Growth	Δ.Sales$_t$/ Sales$_{t-1}$

Annex 3.B Measures of financial constraints

We measure firms' financial constraints based on the indices proposed by Kaplan and Zingales (1997), Whited and Wu (2006) and Hadlock and Pierce (2010). Firms are assigned values based on 1993 data, i.e. one year before the opening of the NSE. We then classify firms as 'constrained' or 'unconstrained' according to whether their index values are in the top or bottom tercile, respectively. Details on the composition of financial constraints measures are provided below.

• KZ index

KZ index is derived from Kaplan and Zingales (1997) and formulated in the subsequent work of Lamont et al. (2001). Each firm is assigned a value of financial constraints based on the formula:

$$KZ = -1.002\ \textit{Cash flow} + 0.283\ Q + 3.139\ \textit{Leverage} - 39.368\ \textit{Dividends} - 1.315\ \textit{Cash}$$

where *Cash flow* is the sum of net income before extraordinary items and depreciation deflated by capital measured by PPE (property, plant and equipment), *Q* is the market-to-book ratio measured as the sum of book value of assets plus the market value of common equity less the book value of common equity all deflated by the book value of assets, *Leverage* is the ratio of the book value of total debt to the sum of book value of total debt and book value of common equity, *Dividends* is the ratio of dividends to capital and *Cash* is the ratio of cash holdings to capital.

• WW index

WW index is derived from Whited and Wu (2006). Each firm is assigned a value of financial constraints based on the formula:

$$WW = -0.091\ \textit{Cash flow} - 0.062\ \textit{DIV\_dummy} + 0.021\ \textit{LTD} - 0.041\ \textit{Assets} + 0.102\ \textit{Industry Sales Growth} - 0.035\ \textit{Sales Growth}$$

where *Cash flow* is firm's cash flow to total assets, *DIV_dummy* is a dummy taking values one if the firm paid a cash dividend on that particular year and zero otherwise, *LTD* is long-term debt to total assets, *Assets* is the natural logarithm of firms' total assets, *Industry Sales Growth* is firm's median industry sales growth and *Sales Growth* is firm's sales growth.

• SA index

SA index is derived from Hadlock and Pierce (2010). Each firm is assigned a value of financial constraints based on the formula:

$$SA = -0.737\ \textit{Size} + 0.043\ \textit{Size}^2 - 0.040\ \textit{Age}$$

where *Size* is the natural logarithm of firms' total assets and *Age* is the natural logarithm of years since incorporation.

Annex 3.C First-stage regressions in dealing with self-selection

This Table presents results from first-stage regressions in dealing with the self-selection problem described in Section 3.5.2. The regression is a probit model in which the dependent variable is a dummy variable taking values one for dual-listed firms (column 1), dual-listed firms as of 1994 (column 2), dual-listed firms as of 1995 (column 3) and zero for benchmark firms (See equation (3.4)). All specifications include a set of control variables associated with the cross-listing decision and year dummies. Definitions of these variables are provided in the Appendix (Annex 3.A). Standard errors are clustered at the firm level and p-values are depicted in parentheses with ***, **, * indicating statistical significance at 1%, 5% and 10% respectively.

	NSE All	NSE 94’	NSE 95’
	(1)	(2)	(3)
$Assets_{t-1}$	1.417***	1.191***	0.278***
	(0.000)	(0.000)	(0.000)
Age_{t-1}	-0.449***	-0.127	-0.230***
	(0.000)	(0.121)	(0.000)
FX $Sales_{t-1}$	0.007*	0.012**	0.004
	(0.071)	(0.011)	(0.215)
Sales $Growth_{t-1}$	-0.164*	-0.272**	0.045
	(0.075)	(0.030)	(0.484)
Industry $M2B_t$	1.089***	0.777***	0.016
	(0.000)	(0.002)	(0.923)
$PBITDA_{t-1}$	5.413***	4.643***	2.228***
	(0.000)	(0.000)	(0.000)
Industry $Leverage_t$	-0.612	-1.768**	0.388
	(0.282)	(0.016)	(0.356)
Group	0.238***	0.031	0.408***
	(0.010)	(0.843)	(0.000)
$ILLIQ\_BSE_{t-1}$	-0.035	-0.131**	0.120***
	(0.329)	(0.021)	(0.000)
constant	-10.823***	-10.537***	-3.137***
	(0.000)	(0.000)	(0.000)
Year dummies	X	X	X
pseudo R^2	0.614	0.562	0.135
Obs.	9,086	9,086	9,086

Concluding Remarks

Over the past two decades, emerging markets have attracted considerable media and academic attention in their transition to becoming open economies. This attention can partly be explained by the unique features of domestic firms, such as their concentrated ownership structures and large cash holdings. Differences in these attributes from the experience and research on firms in the U.S. and U.K. markets necessitate a better understanding of financial decisions of emerging market companies. This thesis builds on these efforts by studying cash holdings of firms in a representative emerging market, India.

India offers an ideal laboratory for the scope of our analysis. Recovering from a severe balance of payments crisis in the early 1990s, the country embarked on a number of initiatives and reforms to rejuvenate its economy and improve its competitiveness in the global markets. Three elements of the country's transitioning phase are of interest here, as they were likely to have had implications on firms' cash holdings and related financial policies.

The first setting considers the increasing presence of foreign institutional investors in Indian capital markets. Following the lifting of restrictions on foreign ownership of corporate assets, there was an influx of foreign institutional investors pursuing their participation in primary and secondary markets. These developments were likely to pose challenges to firm-level corporate governance and reduce private benefits in firms' cash holdings accruing to controlling shareholders.

The second setting examines firms' external finance decisions and their link to savings in the form of precautionary cash holdings. In a period of improved capital market conditions, firms were likely to raise new capital and save proceeds as cash to secure financing for future investment. The issuance-saving link may be useful to draw inferences on firms' precautionary motives in cash holdings and their implications on firm investment.

Finally, this work explores developments in capital market institutions. It studies the birth of a new stock exchange and its implications on firm investment. In pursuit of greater access to capital free from market frictions, firms already listed on a stock exchange were likely to cross-list shares on the new market to expand their capacity to finance investment.

In this context, the dual-listing status within a country's borders can uniquely identify implications of equity market developments on real-firm behavior.

The main findings and related implications from our work can be summarized as follows. From the perspective of cash holdings as a backdrop of agency conflicts between corporate insiders and outside investors, the main findings of the first chapter are: i) foreign institutional investors were likely to influence investee firms to reduce their cash holdings, ii) this was likely to materialize through the influence on the board for higher payouts, and iii) this was more pronounced in firms with weaker forms of internal governance.

Overall, results in the first chapter propose that by focusing on the fundamental problem of holding cash, foreign institutional investors were likely to: i) directly reduce private benefits in cash holding accruing to controlling shareholders, and ii) effectively monitor other related financial policies such as payouts, investments and compensation policies. Therefore, the main implication of this work is that foreign institutional ownership may be a key mechanism to improving firm-level corporate governance in emerging market companies and cash holdings in particular, may be a channel through which this works.

Notwithstanding agency concerns associated with cash holdings, evidence in the second chapter shows that they can also serve to smooth out adverse effects on firm investment from deteriorating capital market conditions. The key finding of the chapter is that firms with low internal funds to meet investment demand were likely to raise new equity and simultaneously save proceeds as cash consistent with precautionary motives. Cash savings from equity proceeds in good times were important for buffering firms' investment declines during the 2008-9 global financial crisis. These findings suggest that precautionary-saving motives can be an integral part of firms' external financing decisions in emerging markets with similar environments.

Importantly, the issuance-saving link did not necessarily entail a sacrifice on contemporaneous investment. When times were good and the cost of raising new equity relatively low, firms raised outside funds additional to current finance needs to transfer financing capacity from good to bad states of the world. These results do not expand to outside debt. There is only weak evidence to suggest that debt proceeds in good times were likely to contribute positively to firms' post-issuance saving behavior.

Deviating somewhat from the cash holding story, the final chapter capitalizes on the creation of a new stock exchange in India during the middle 1990s, the National Stock Exchange. This work examines whether deepening domestic capital markets following the birth of the new market alleviated financial constraints at the firm level. The main finding of this work is that developments in equity markets can have significant implications on real-firm behavior. In particular, firms which pursued a dual listing of their shares on the new market experienced higher levels of investment than their peers which remained listed on the country's primary market (Bombay Stock Exchange) and these results were more pronounced in firms facing larger financial constraints.

Importantly, however, dual-listed firms did not necessarily attain a valuation premium over their peers which remained listed on the primary market. Valuation benefits in cross-listings were persistent only in firms sustaining a more liquid trading environment for their shareholders. This evidence implies that a valuation premium accompanying developments in equity markets can occur only through the channel of enhanced stock liquidity. These results support survey-based evidence that managers' primary motivation in cross-border listings is to create a more liquid environment for firms' shareholders (e.g. Bancel amd Mittoo, 2001; 2009).

What have we learned from this thesis that we didn't know? The primary new knowledge stems from investigating a representative emerging market in its transition to becoming an open economy. In this context, our first contribution is to show that as domestic firms integrate with the world economy, their cash holdings are likely to attract the attention of international investors. Prior research has highlighted the monitoring role of foreign institutional investors in emerging markets but has not provided adequate evidence of the channels that this works. Our work shows that by extrapolating their international exposure and advanced monitoring technologies to emerging markets, foreign institutional shareholders may actively pursue less liquid balance sheets in domestic firms.

Our second contribution is to show that increased valuations attained by firms which diversify their ownership structures in the open economy are partly driven by higher values of their cash holdings. We build on prior research which associates higher valuations with international cross-listings by suggesting that higher valuations may also attained by the 'import' of governance-sensitive institutional investors in domestic capital markets.

Our third contribution is to highlight that cash holdings of emerging market companies serve an important precautionary function. Contrary to prior research which has overwhelmingly emphasized agency problems, our work identifies a strong motive to build precautionary cash holdings out of new equity proceeds, particularly in firms anticipating uncertain financing conditions.

Relatedly, our fourth contribution is to show that better-functioning capital markets do not necessarily entail a lower demand for cash. In our sample, firms facing larger information asymmetry and agency problems were likely to build externally-financed cash holdings when external market conditions were favourable, to an extent, as a means to relieving financial constraints exacerbated by these problems. This highlights an important interplay between precautionary and agency motives in cash holding not explored before.

A fifth contribution of our work is to explain why firms' cash holdings may not be sufficient to buffer investment declines during an external finance shock. Prior research has treated cash holdings as a predetermined variable or as resulting from changes in related financial decisions (e.g. reduced payouts). Our work instead proposes a number of firm-level factors such as internal governance, ownership dilution, issuance costs, and group affiliation which limit the issuance-saving link.

A sixth contribution of our research is to show that deepening domestic capital markets can enhance firms' access to capital but may not relate to higher firm values, unless they are accompanied by a more liquid trading environment for firms' shareholders. This result highlights the importance of stock liquidity in public equity markets even in environments in which firms have concentrated ownership structures.

Relatedly, our final contribution is that advancements in domestic equity markets can attenuate incentives of managers to pursue a cross-listing overseas. This implication is important in light of the negative implications that cross-listings can entail to domestic market liquidity conditions.

What are the possible limitations to this work? A potential concern with our inferences is that the Indian setting may not be representative of other emerging and developing countries. Although large cash holdings have been documented in different institutional contexts outside the U.S. and U.K. markets, it is possible that inferences based on the link between cash holdings and equity markets may be less pronounced. In addition, different countries may have followed different paths in their transition to becoming open economies. As a result, developments in financial, legal and institutional factors in other economies may have different implications on cash holdings and related financial policies at the firm level. A final concern is that the evolving nature of a firm's external environment makes it difficult to empirically isolate the impact of a particular factor on corporate outcomes. Keeping this in mind, we have performed a number of additional and robustness tests to verify the validity of our findings.

How can future research build on this thesis? This work has produced a set of different implications on cash holdings of emerging market companies in their transition to opening up to the world economy. Future research could build on these results by exploring to what extent institutional ownership may promote the convergence of corporate cash holdings internationally. Although past studies have raised awareness of the issue of convergence in corporate governance practices (e.g. Aggarwal et al., 2011), it would be interesting to identify any similar trends in real-firm decisions such as investments in liquid assets. Of particular interest would be to draw inferences on convergence on firms' ability to weather correlated finance shocks. That is, while firms may have similar cash-to-asset ratios in different countries, they may vary greatly in terms of the development of financial markets and institutions.

An alternative path for future research would be to study the link between institutional ownership and cash holdings across states of the world. In particular, it would be interesting to examine whether the accompanied reduction in cash holdings exposes the firm to a negative finance shock.

Relatedly, there is still little knowledge on the link between cash hoarding and macroeconomic conditions. Recent studies which work towards that direction include the work by Azar et al. (2016) which examines the opportunity cost of holding liquid assets.

From another perspective, changing demographics and the increasing dividend clientele of pensioners is a promising opportunity to study rising trends in cash holding. The work by Becker et al. (2011) on U.S. data is suggestive of this trend. However, implications may be more pronounced when studying differences in demographics between the developed and developing world.

Finally, future research could build on our work by exploring implications of firms' cash holdings on mergers and acquisitions in different institutional contexts and in conjunction with other financial instruments such as trade credit. We consider these as well as other related topics as fruitful for future research, for which this thesis can serve as a reference.

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