Global and local information asymmetries, illiquidity and SEC Rule 144A/Regulation S: The case of Indian GDRs

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Abstract

Between 1992 and 1997, Indian firms were the most frequent issuers of equity-backed Global Depositary Receipts (GDRs) governed by the SEC's Rule 144A and Regulation S. They also accounted for the highest dollar volume. Home-market stock price responses to these issues are consistent with the hypotheses that GDRs enable firms to resolve two forms of information asymmetry: (1) an asymmetry between issuing firms and international investors that results from market segmentation and (2) an asymmetry between Indian firms and home-market investors that resembles asymmetries that help explain abnormal returns in equity private placements by US firms. Our evidence suggests that GDR issuance can increase investors' recognition of underlying shares even if there are no liquidity enhancements and even if disclosure requirements are not as demanding as those imposed on foreign firms whose depositary receipts trade in public US markets.
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1. Introduction

Recent studies by Foerster and Karolyi (1999) and Miller (1999) document explosive growth in the number of foreign firms accessing US capital markets and in the amount of capital they raise. Both studies focus on initial placements of American Depositary Receipts (ADRs). Miller finds positive announcement period abnormal returns for his total sample, with higher returns in subsamples for which ADRs trade on major US exchanges and (if capital is raised) in subsamples for which the ADR is a public rather than a private issue. Foerster and Karolyi find positive excess returns in the year before and in the week of the ADR listing, but negative returns in the year after. Domestic betas also fall in the post-listing period, especially when firms list their ADRs on the NYSE. These findings support the hypothesis that ADRs increase shareholder wealth by reducing the cost of capital and increasing international investors' awareness of issuing firms (see Amihud and Mendelson, 1986; Merton, 1987). [2]

We extend Foerster and Karolyi (1999) and Miller (1999) in several ways. First, we deepen Miller's analysis of private placement issues through SEC Rule 144A. We also examine offshore issues governed by the SEC's Regulation S. We do this by focusing on an almost exhaustive sample of Global Depositary Receipts (GDRs) issued by Indian firms between 1992 and 1998. GDRs differ from ADRs in that they trade concurrently in US and *other* markets. Since the SEC adopted Rule 144A and Regulation S in April 1990, firms in almost 60 foreign countries have used these provisions to raise capital outside their geographic boundaries.

We focus on Indian firms for two reasons. First, they account for more than 14% of the number and for more than 22% of the dollar volume of Rule 144A equity issues through 1997. They also account for 19% of the number of Regulation S offerings by foreign firms. [3] Second, Indian GDRs have unique features relating to voting rights, cash flow rights, and the availability of substitute securities that enable us to distinguish more clearly between the liquidity and investor recognition hypothe-

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[2] Other important contributions of Miller's work are his focus on announcement period returns and his inclusion of firms that raise capital through DRs. Most other authors (e.g., Eun et al., 1993; Jayaraman et al., 1993) who examine home-market stock price responses to DR issues examine issue date abnormal returns and look only at cross listings. Doukas and Switzer (2000) look at announcements by Canadian firms that list their shares on US exchanges. Their results are similar to the results presented by Miller (1999).

[3] The next most frequent issuers account for only 7.65% (Taiwan) of the equity GDRs issued under Rule 144A. These statistics are taken from the Bank of New York's comprehensive listing of all GDRs issued through July 1998 and from Bethel and Sirri (1998). Bethel and Sirri (p. 31) report that securities sold in the private markets in 1991 accounted for only 2% of the securities sold in public markets. By 1997, Rule 144A issues had catapulted to 20% of the dollar amount of public issues. Between 1991 and 1997, the aggregate dollar volume of 144A debt was 591.4 billion. The aggregate dollar volume for common equity issues was 27.0 billion. As indicated above, Indian GDRs account for about 22% of that volume.

ses of Amihud and Mendelson (1986) and Merton (1987) than prior studies have done. [4]

Distinguishing between these hypotheses is important. Existing tests show that publicly traded ADRs reduce information asymmetries and provide greater liquidity but at a cost of higher-quality disclosures. Our tests show that Rule 144A and/or Regulation S GDRs reduce information asymmetries but with lower-quality disclosures and, consequently also, less liquidity. Since both public and private placements reduce information asymmetries, the question foreign firms face is whether the incremental costs of providing higher-quality disclosures are matched by larger increases in firm value from the greater liquidity foreign (and home-market) investors enjoy.

The mean announcement period abnormal return in our sample (3.24%) closely resembles the mean announcement period return in Miller's (1999) sample of publicly placed, capital-raising ADRs (3.23%). Thus, we cannot conclude that publicly placed ADRs that reduce information asymmetries and enhance liquidity produce greater average wealth effects than privately placed GDRs that only reduce information asymmetries.

To examine the nature of the information revealed by GDR issues more closely, we also extend Foerster and Karolyi's (1999) analysis of issue period abnormal returns. Issue period abnormal returns may contain information not contained in announcement period abnormal returns because details of GDR issues are not typically available until just before the issue date. Though our mean issue period abnormal return is insignificantly different from zero, the cross-sectional variation can be explained by a modified market incompleteness factor in the same way as Foerster and Karolyi (1999) explain cross-sectional variations in their sample with the market incompleteness factor they adopt from Kadlec and McConnell (1994). This factor is

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[4] Indian law restricts direct equity ownership of Indian firms' shares by investors who are not local citizens. As Section 2 explains, Foreign Institutional Investors (FIIs) can hold Indian firms' shares, but holdings of all FIIs combined in any firm may not exceed 24% of shares outstanding, not including GDRs. If FIIs demand for shares is below the 24% limit, they can satisfy that demand without buying a GDR. If demand exceeds the limit, FIIs can still only invest up to the limit with their holdings in the home market. Thus, the GDR issue does not increase the number of buyers in the home market. If enhanced liquidity depends on having more buyers, it is an unlikely explanation of the home-market price effects from Indian GDR issues.

Besides these unique features of Indian GDRs, the importance of the Rule 144A and Regulation S markets per se adds significance to our findings. Citibank's 1999 year-end review states that foreign firms raised more than $21billion through DR issues in 1999 alone. Of the 10 largest DR issues, three were 144A GDRs in which one Taiwanese and two Korean firms raised a total of $1.92 billion. The Bank of New York DR summary indicates that approximately 40% of the total number of DRs issued in 1999 were Rule 144A and/or Regulation S issues. Since private and offshore issues can be large and relatively frequent sources of funding for foreign firms, understanding foreign firms' incentives to issue DRs is important. The literature on Rule 144A and Regulation S capital raising activities is small, but growing. Chaplinsky and Ramchand (2000) and Fenn (2000) analyze Rule 144A debt issues, and Aggarwal et al. (1999) and Choi (2000) describe how corporations raise capital in the offshore market using Regulation S.

the product of the firm's idiosyncratic risk, its relative size, and the change in its shareholder base. Merton (1987) shows that as firms increase their shareholder base and the market becomes more complete, the cost of incomplete information should decline and the price of the stock should increase. Foerster and Karolyi document evidence consistent with that hypothesis for publicly traded ADRs. Stock price reactions to privately placed issues of Indian GDRs are also consistent with that hypothesis. Given the differences in disclosure requirements imposed on private vis-à-vis public placements, this finding may corroborate recent evidence in Fenn (2000, p. 383) that suggests "that sophisticated investors do not value the incremental information provided by securities registration...". [5]

Though (as we explain in more detail below) the liquidity of Rule 144A issues exceeds the liquidity of traditional private placements, initial purchasers are restricted to Qualified Institutional Buyers (QIBs). Besides the potential illiquidity caused by this limitation, other features of Indian GDRs may also raise concerns for prospective buyers. Specifically, Indian GDR holders have restricted voting privileges and their cash flow rights are the same as the cash flow rights of the holders of the underlying shares. [6] Absent a cash flow advantage, investors facing potential illiquidity and restricted voting rights have heightened incentives to price the GDRs correctly. If home-market investors understand these incentives and observe the *relative price* (i.e., the premium or discount relative to the home-market stock price) at which GDRs are initially offered, then this relative price can convey useful information to home-market investors that certifies the value of their shares.

Consistent with that argument, we find that issue period abnormal returns relate positively with the relative price of the GDR. We interpret this evidence and the similarity between our findings and those reported by Foerster and Karolyi (1999) as support for the hypothesis that issue period abnormal returns reflect two forms of

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[5] The required disclosure depends on whether the GDR is sponsored or not and, if sponsored, on its level of sponsorship. An unsponsored GDR is set up without the involvement of the foreign firm and does not require disclosure with the SEC. Sponsored programs, by contrast, are initiated by the firm under one of four levels. Level I is for OTC trading; Level II is for public listing; Level III is for listing and offering; and Level IV is for private placement. The 144A and Regulation S GDRs are Level IV placements whose disclosure requirements (governed by SEC rule 12g32(b)) are the same as the requirements imposed by regulatory bodies in the home countries. More detailed explanations of disclosure requirements under various levels of sponsorship are provided in Miller (1999) and Foerster and Karolyi (1999).

[6] Either the GDR holder has no voting privilege, or (after receiving a legal opinion from the GDR issuer) the depositary sends a proxy to GDR holders. If the proxy is not returned to the depositary, the voting rights are retained in the company. If proxies are received, the depositary may vote by proxy for the GDR holders. The Bank of New York was despositary for 25 of the 60 firms in our sample that issued GDRs. None of the GDR holders of these 25 firms had voting rights. We thank officials at the Bank of New York and the office of Managing Director (Research) at the NYSE for clarifying these unique aspects of Indian GDRs to us.

information asymmetry discussed by Merton (1987). The first occurs because information about Indian firms is not disseminated *broadly* enough among *international investors*. The second occurs because information that is available is not appreciated *deeply* enough by *home-market investors*. We argue that the GDR issuance process and the relative price knowledgeable investors voluntarily pay for Indian GDRs *broadens* and *deepens* the understanding of Indian firms' prospects. [7] This interpretation is consistent with findings reported in Bruner et al. (1999) who interview investment bankers handling ADR-IPOs and report that managers of foreign firms believe their shares would be undervalued in their home market. However, our study deals with *private* placements by foreign firms while Bruner et al. (1999) deal with *public* placements.

Besides the two forms of information asymmetry, issue period abnormal returns may also reflect market timing effects if, as Loughran and Ritter (1995) argue, managers take advantage of a ''window of opportunity'' to issue equity. Our evidence apparently supports this hypothesis because Indian GDRs are issued predominantly when the Indian market is performing well relative to other world markets. However, the ratio of Indian and world market values prior to Indian GDR issues relates inversely with issue period abnormal returns and with the relative price of the GDR. Thus, investors do not appear to be fooled by market conditions.

We argue that announcement and issue period abnormal returns in our sample reflect the resolution of information asymmetries rather than liquidity enhancements. However, resolving information asymmetries can create greater liquidity if such asymmetries create barriers to trade. To test changes in liquidity directly, we also compare trading volume behavior before and after the GDR issue. Because mean home-market abnormal volume for Indian firms' shares is slightly lower after the issue than it was before, our empirical analysis corroborates our argument that changes in liquidity are unlikely to explain the home-market stock price effects we observe.

The rest of the paper proceeds as follows. Section 2 discusses the evolution of SEC Rule 144A and Regulation S. It also describes institutional details in Indian capital markets and specific features of Indian GDRs. Section 3 describes our data. Section 4 presents the empirical results, and Section 5 summarizes our findings.

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[7] Another interpretation of announcement period stock price effects of private placement issues is provided by Wruck (1989). She argues that holders of large blocks of illiquid privately placed equity have greater incentives to monitor and that the potential for increased monitoring induces the positive stock price responses associated with private placement announcements. Though our analysis does not refute Wruck's hypothesis, the absence of voting privileges with Indian GDRs and their greater liquidity compared with traditional private placements reduce the incentives to monitor. Nevertheless, as Merton (1987) suggests, the greater attention arising from GDR issues may make international market participants more aware of Indian firms' performance. Thus, even if sanctions imposed through direct voting controls are unavailable to holders of Indian GDRs, Indian firms' access to world capital markets could be denied if their performance falls substantially below acceptable levels.

2. Discussion of SEC Rule 144A and Regulation S and description of institutional details of Indian capital markets and Indian GDRs

2.1. Rule 144A and Regulation S

In April 1990, the SEC adopted Rule 144A which governs the resale of privately placed securities by Qualified Institutional Buyers (QIBs). [8] Because Rule 144A attempts to provide an efficient and liquid market for institutional investors, *no waiting period* exists for trading these securities if buyers and sellers are both QIBs. Trades of 144A offerings are executed under the PORTAL (Private Offerings Retail Trading Automated Linkage) system, established in 1990 by the NASD. Only ''non-fungible'' securities (i.e., securities that are not part of the same class as securities simultaneously listed on a US exchange or OTC) can trade on the PORTAL system. PORTAL trades are cleared through the Depository Trust Corporation. GDRs issued under Rule 144A by Indian firms are not ''listed'' on US exchanges. However, PORTAL trading and other telecommunications options provide some liquidity for US QIBs that is not available in traditional private placements.

Regulation S, also adopted by the SEC in April 1990, governs the registration of offshore placements by both US and foreign issuers and provides guidelines for subsequent secondary market resales within the US of securities originally issued as offshore placements by both foreign and US issuers. Aggarwal et al. (1999) and Choi (2000) discuss the use of offshore markets for raising capital. Unlike Rule 144A, Regulation S prohibits pre-selling securities in the US. To avoid subjection to US securities laws, Regulation S offerings must be sold and come to rest outside the US with no efforts to sell initially inside the US. However, Regulation S placements may trade on many exchanges internationally where securities trade that are *not* technically listed. The SEC recognizes 16 such exchanges as ''Designated Offshore Securities Markets'' (DOSM). [9] Trades on these DOSM are settled through European Clearing Agencies CEDEL or EUROCLEAR rather than through exchange facilities *per se*. If a US broker, acting for a US customer, places an order on the DOSM for securities issued under Regulation S, the SEC treats the transaction as ''offshore.'' The US purchaser (if not a dealer or distributor) can then resell such securities without restriction in the US. The direct access of Regulation S offerings to DOSM and their indirect access to US markets enhances the liquidity of offshore placements.

Though Rule 144A and Regulation S offerings are more liquid than traditional private placements, they are less liquid than publicly placed ADRs. However, they

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[8] The discussion in this section closely follows Bethel and Sirri (1998) and Bloomenthal (1998). Broadly defined, QIBs are: (1) institutional investors whose own securities portfolios equal at least $100 million, (2) banks and savings and loans that, besides the $100 million portfolio requirement, also have $25 million or more in net assets, and (3) securities dealers registered under the Exchange Act who have at least a $10 million portfolio. An entity wholly owned by any QIB, except a bank or insurance company, is also a QIB.

[9] These markets include Amsterdam, Australia, Brussels, Frankfurt, Hong Kong, London International (not the London Stock Exchange), Johannesburg, Luxembourg, Milan, Montreal, Paris, Stockholm, Tokyo, Toronto, Vancouver, and Zurich.

also require lower-quality disclosures. According to Foerster and Karolyi (1999, Table I) both Level II and Level III ADRs require annual filings of Form 20-F with a reconciliation of financial accounts with US Generally Accepted Accounting Principles (GAAP). In contrast, Rule 144A and Regulation S offerings are governed by SEC Rule 12g3-2(b) which requires only home country accounting statements with adequate English translation. Thus, relative to publicly-placed ADRs, the GDRs in our sample require lower-quality disclosures. Consequently, they also provide less liquidity. As we discuss below, some of the institutional features of Indian capital markets also limit liquidity enhancements for home-market investors after GDRs are issued.

2.2. Institutional details of Indian capital markets and Indian GDRs

In July 1991, shortly after the SEC adopted Rule 144A and Regulation S, the Indian government announced the New Industrial Policy to liberalize its economy. In 1992, the Securities and Exchange Board of India (SEBI) was created with statutory authority to oversee India's capital markets. The SEBI has initiated and implemented extensive reforms in all 23 Indian stock exchanges. [10] However, we focus here on reforms related to investments in Indian firms by foreign investors and to Indian firms' ability to raise capital abroad.

As part of its Economic Liberalization Policy in 1992, the Indian government permitted Foreign Institutional Investors (FIIs) to invest directly in Indian securities under specific guidelines, issued by the Reserve Bank of India and the SEBI. Other sources of foreign investment include Non-Resident Indians, Overseas Corporate Bodies, and GDRs. To date, severe restrictions are placed on each source. We discuss restrictions specific to FIIs and GDRs.

FIIs must register with the SEBI before they trade securities listed on Indian stock exchanges. Since the Indian rupee is not freely convertible, FIIs must also apply with the Reserve Bank of India for permission to trade Indian securities. FIIs must also register with the SEC or the comparable regulatory body in their respective countries of domicile or incorporation. Though ownership restrictions vary across industries,

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[10] The Bombay Stock Exchange, the biggest and most important exchange in India, operates from 9:30 a.m. to 4:00 p.m. weekdays. Clearing and settlement are managed by National Securities Clearing Corporation. Berkman and Eleswarapu (1998) discuss operations at an earlier stage of their evolution and report that (except for carryover provisions) settlement took place once every 14 days. Currently, the exchange facilitates multiple settlement mechanisms including account period (Wednesday through Tuesday) and rolling period (five business days) settlements. Physical settlements occur through the Clearing House, while book-entry settlements occur through depositaries. Funds settlements take place through designated clearing banks. The Clearing Corporation strictly enforces penalties for the noncompliance with settlement procedures. Indian stock exchanges currently have no market makers bound to give two-way quotes or to act as dealers for any particular stock. However, in March of 1998, the SEBI established a committee to study market making and to draft procedures for its implementation. The committee released its report in October 1999 and the SEBI finalized guidelines for market making in January 2000. (This information comes from various publications of the SEBI and from *Business Line*, 27 January 2000 and *Economic Times*, 5 October 1999.)

combined investments of all FIIs in primary and secondary markets in India may, in general, not exceed 24% of capital in any company. Holdings of a single FII in any company may not exceed 5% of capital.

Bekaert and Harvey (2000, Table I) indicate that as of December 1995, the US percentage ownership of Indian firms was only 1.14%, third lowest of the emerging market countries in their sample. In 1998, only 200 FIIs were registered with the SEBI. Bloomenthal (1998), in contrast, reports that there are 4000 QIBs. Even if all FIIs registered with the SEBI were QIBs, 3800 of 4000 FIIs eligible to purchase Indian GDRs would not be eligible to buy Indian shares on the home market. [11] Thus, large increases in direct foreign holdings of Indian shares through GDR issues seem unlikely.

The Economic Liberalization Policy of 1992 also removed the prohibition against Indian companies' issuing securities publicly outside of India. Consequently, Indian firms may now issue GDRs subject to the approval of the Ministry of Finance. These GDRs may be denominated in any freely convertible foreign currency and may be listed on any international stock exchange. However, they may not be held by Indian citizens. Moreover, the ordinary shares underlying the GDRs are denominated only in rupees and trade only in India.

If GDR holders ask the overseas depositary to redeem the GDRs for the underlying shares, their requests must be transmitted to the custodian bank in India and then to the issuing company. For much of our sample period, GDR holders could only redeem their GDRs for direct sale of the released shares on the Bombay Stock Exchange. They could not redeem GDRs to hold the underlying shares. Thus, substituting GDRs for underlying shares was slow at best and impossible at worst. Hence, even though GDRs could trade freely among QIBs and the underlying shares could trade freely among home-market investors, Indian law still stifled liquidity enhancements potentially available from increasing the base of investors that could hold home-market shares.

3. Data description

Table 1 lists the calendar time distribution of GDRs by firms in our sample. The sample extends from 1992 to the middle of 1998. *Economic Times*, an Indian business daily similar to the *Wall Street Journal*, gives the month and year of each issue for both debt and equity GDRs. Our sample contains 60 of the 66 equity-backed GDRs issued by Indian firms over the sample period. [12] Thirty-seven GDRs were issued in 1994. This clustering extends across SEC provisions, though single-provision offers

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[11] Because these FIIs are from all over the world, the actual number of US FIIs that qualify to be QIBs must be significantly less than 200.

[12] Fifty firms in our sample issued one GDR; five firms issued two. There were 11 issues by conglomerates, 11 by textile firms, 5 by automotive companies, 5 by chemical firms, 4 by pharmaceutical firms, and 4 by telecommunications firms. The fertilizer, hotel, and mining industries each had three events in the sample. No other industry had more than one event.

Table 1
Calendar time distribution of GDRs issues by Indian firms

Year	Total sample	Rule 144A	Regulation S	Tandem
1992	2	1	1	0
1993	6	2	4	0
1994	37	16	7	14
1995	4	0	1	3
1996	9	3	0	6
1997	2	0	0	2
Total	60	22	13	25

This table reports the calendar time distribution of equity-backed Global Depositary Receipt issues by Indian firms between 1992 and 1997. *Economic Times*, an Indian business daily similar to the *Wall Street Journal*, gives the month and year of each issue. Fifty firms in our sample issued one GDR; five firms issued two.
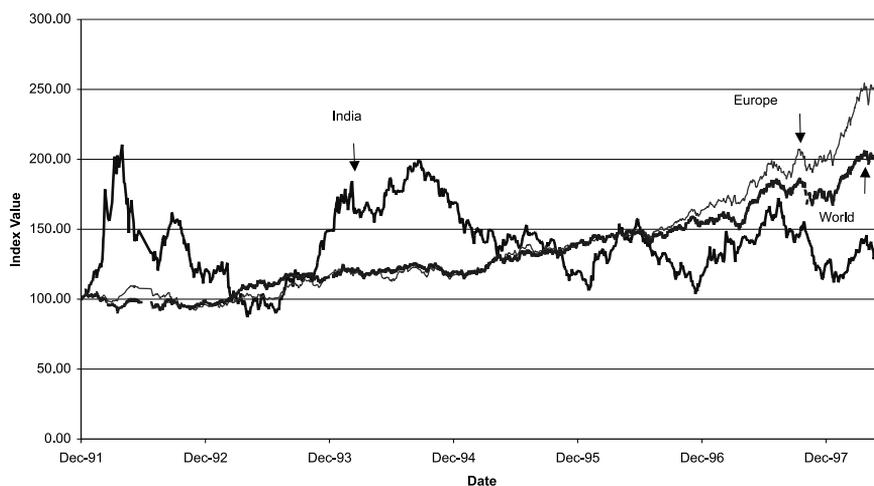

Fig. 1. Comparisons between Indian stock price movements and movements in European and World Indexes. Data for the Bombay ''Sensex'' Exchange come from the PROWESS data base maintained by the Center for Monitoring Indian Economy (CMIE) in Bombay. Data for the European and World Indexes and for exchange rates to convert Indian rupees to US dollars come from Bloomberg. The indexes use price levels as of 31 December 1991 as a base (i.e., as 100). This date follows the inception of the New Industrial Policy in India by approximately six months.

occur relatively more frequently in the early and middle parts of the sample, while tandem (combination) offers occur more frequently in the middle and later parts. [13]

A potential explanation for the clustering is Loughran and Ritter's (1995) ''window of opportunity'' hypothesis. To illustrate, Fig. 1 compares price movements of

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[13] Though there is a clustering of GDR issues in the event years, there is no similar clustering across months, or days of the month as documented by Korajczyk et al. (1991) for US offerings.

the Bombay ''Sensex'' Index (BSE) to movements in a European and a World Index. Daily data for the BSE come from the PROWESS data base maintained by the Center for Monitoring Indian Economy (CMIE) in Bombay. Daily data for the European and World Indexes and for exchange rates to convert Indian rupees to US dollars comes from *Bloomberg*. The indexes use prices on 31 December 1991 as the base (i.e., as 100). This date follows the inception of the New Industrial Policy by about six months.

Fig. 1 shows that BSE prices doubled in early 1992 while the European and World Indexes remained fairly flat. Though the BSE declined and remained close to European and World Index levels from mid-1993 to the end of the year, it rose again quickly and remained high throughout 1994 and into 1995. Thus, Indian firms issued most of their GDRs when their home market was performing well compared with European and other world markets. After 1995, when the Indian index declined and remained below the European and World Indexes, the number of Indian GDR issues tapered off.

This surge and subsequent decline in the number of GDRs issued support Loughran and Ritter's (1995) evidence and may suggest that Indian managers take advantage of attractive market conditions to issue equity. Of course, the need to get approval from the Ministry of Finance to issue GDRs may limit this explanation. Bekaert and Harvey (2000) argue that governments may choose to let firms issue ADRs when it is most advantageous to the governments, even if stock prices are low. However, Fig. 1 clearly shows that most Indian GDRs were issued when the Indian market was performing well relative to other world markets. Thus, we entertain the ''window of opportunity'' hypothesis in our tests below. We also examine whether information asymmetries resulting from market segmentation and home-market misvaluations help explain Indian GDR issuance.

Table 2 categorizes the sample by the exchange (DOSM) on which the GDR trades. Data for this table come from *Bloomberg*. Indian GDRs trade on a combination of three exchanges – the London International Exchange, Luxembourg, and Frankfurt. (In London and Luxembourg, GDRs trade in US dollars. In Frankfurt, they trade in Deutsche Marks.) If GDRs trade on a single exchange, the most frequent choice (21 of 60) is Luxembourg. However, 12 GDRs trade on all three ex-

Table 2
Distribution of sample by exchange where Indian GDRs trade

Exchange	London International	Luxembourg	Frankfurt	All three	Total traded here
London International	1	–	–	–	37
Luxembourg	21	21	–	–	56
Frankfurt	3	2	0	12	17

This table summarizes GDRs issued by Indian firms between 1992 and 1997 by the exchange on which the GDRs trade. Data for the exchange come from *Bloomberg*. Diagonal cells indicate trading on a single exchange. Off diagonal cells represent cross-trading on multiple exchanges. Duplicating cells, which are mirror images, are left blank. The cells in the last column do not sum to 60 because they include cross-listings. The London International is a Designated Offshore Securities Market as per the SEC and is not the same as the London Stock Exchange.

changes and 21 trade on both the London International Exchange and the Luxembourg Exchange. Besides trading on one or more of these exchanges, all GDRs either trade in the US on PORTAL or are considered "PORTAL" securities in that they trade on a DOSM.

Table 3 reports means of selected pre-issue operating and financial variables for Indian firms. [14] It also reports means of the percentages of shares held by various shareholder groups, and means of selected characteristics of the GDR issues. These data are reported for the total sample and for subsamples divided by the SEC provision under which the GDR was issued. The last column of the table reports χ^2 statistics from tests of the hypotheses that mean estimates of the variables are jointly equal across samples. Single (double) asterisks indicate rejection of the null at the 0.10 (0.05) level.

The pre-issue operating and financial profile variables in the top panel include the level of sales (in millions of $US), the percent of sales accounted for by exports, operating profit margins, long-term debt-to-equity ratios, the aggregate market value of equity (in millions of $US), book-to-market value of equity, the per share market value of equity (in $US), and local market pre-issue betas. The χ^2 statistics in the last column indicate that, on average, firms that issue GDRs under different SEC provisions do not differ statistically along the dimensions in the top panel of the table. The most significant difference ($\chi^2 = 4.47$) is for the percent of total sales accounted for by exports. Though not statistically different at the 0.10 level, those means suggest that the percent of total sales coming from exports is lower for firms issuing 144A GDRs (7.22) than for firms using Regulation S (14.79) or tandem offers (15.90). If export sales create international awareness similar to that created by issuing securities in international markets, the lower percentage of export sales for the Rule 144A issuers suggests that these firms have most to gain from issuing securities outside of India because the substitute form of recognition is lowest for them. Again, however, these inferences are only suggestive since differences are not significant.

The second panel of Table 3 reports mean percentages of shares held by various shareholder groups. Percentages are pre-offer percentages extracted from data that includes shares issued to depositaries as part of the GDR issue. Unlike private placements in other studies, GDR private placements by Indian firms do *not* alter the fractions of votes held by each shareholder group because *holders of Indian GDRs may not vote*. [15] If Indian firms need the votes represented by the shares that back GDRs, they can petition the depositary after obtaining legal clearance in India to vote those

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[14] Accounting variables in Table 3 come from "Executive Summary" files and "Exports and Imports" files within the PROWESS data base of the CMIE. The number of shares used to estimate ownership structures, the total market value of equity, the book-to-market value of equity, and the exact issue dates of the GDRs come from: (1) filings of financial statements made by individual firms with the SEBI; (2) annual reports filed with the Bombay Stock Exchange; (3) capital history files maintained by the CMIE; or (4) various issues of *Capital Market*, published fortnightly by Capital Market Publisher's India Limited. Stock prices come from PROWESS, and other data come from *Economic Times*.

[15] For these calculations, we assume GDR purchasers are "foreign shareholders". If our assumption is incorrect, the percentage of shares held by foreign shareholders in Table 3 will be understated.

Table 3
Profile variables and ownership structures of Indian firms that issued GDRs and of the characteristics of the GDRs, categorized by whether the GDR was issued under Rule 144A, Regulation S, or both

Means of variables (N for total sample with data available)	Total sample	Rule 144A	Regulation S	Tandem	$\chi^2(2)$
Firm profile variables					
Sales ($US MM) for year $t-1$ relative to issue (59)	376.02	279.39	229.51	531.38	2.44
Export sales/total sales for year $t-1$ relative to issue (%) (59)	12.44	7.22	14.79	15.9	4.47
Operating profit margin for year $t-1$ relative to issue (%) (59)	21.33	19.9	22.99	21.78	1.2
Long-term debt to book equity for year $t-1$ relative to issue (58)	1.19	1.22	1	1.25	1.02
Aggregate market value of equity ($US MM) for day $t-25$ relative to issue (47)	661.32	607.78	447.42	824.63	1.94
Per share market value of equity ($US) for day $t-25$ relative to issue (60)	10.76	14.18	9.23	8.54	0.86
Book-to-market value of equity for year $t-1$ relative to issue (45)	0.21	0.19	0.17	0.25	0.95
Pre-issue beta (60)	0.78	0.84	0.66	0.8	3.86
Ownership structure (%) (47)					
Foreign shareholders including non-resident Indians	9.6	13.05	11.92	5.12	0.81
Indian financial institutions	30.93	29.42	18.64	38.83	10.20**
Indian non-financial corporations	29.5	29.21	35.13	26.82	1.12
Directors of issuing firms	3.64	2.94	8.14	1.94	2.77
Other 50 largest shareholders	2.41	2.06	2.8	2.54	1.01
Indian public	23.88	23.29	23.34	24.72	0.16

Characteristics of the GDR issue

Size of issue ($US MM) (60)	97.50	85.44	61.68	126.74	9.54**
Shares deposited with depositary (MM) (58)	18.51	15.62	8.79	27.26	8.55**
Shares deposited relative to shares outstanding in year $t-1$ (%) (47)	24.48	21.73	22.89	27.92	0.85
Shares issued per GDR (60)	2.26	1.90	1.42	3.02	4.70*
Price per share issued relative to price per share on day $t-6$ (60)	0.92	0.89	0.99	0.9	2.65

This table summarizes selected operating and financial variables for Indian firms that issued GDRs between 1992 and 1997. It also summarizes the percentages of shares held by various shareholder groups of the Indian firms in our sample, and the characteristics of the GDR issues. Single (double) asterisks next to the χ^2 statistics in the last column indicate significant differences at the 0.10 (0.05) level between the means of the variables in the table for Rule 144A, Regulation S, and Tandem offers. Accounting variables come from "Executive Summary" files and "Exports and Imports" files within the PROWESS data base of the Center for Monitoring Indian Economy (CMIE). The number of shares used to estimate ownership structures, the total market value of equity, the book-to-market value of equity, and the exact issue dates of the GDRs come from: (1) filings of financial statements made by individual firms with the Securities and Exchange Board of India (SEBI), (2) annual reports filed with the Bombay Stock Exchange, (3) capital history files maintained by the CMIE, or (4) various issues of *Capital Market*, published fortnightly by Capital Market Publisher's India Ltd. Stock prices come from PROWESS. Other data come from *Economic Times*, an Indian business daily similar to the *Wall Street Journal*.

shares by proxy. The χ^2 statistics indicate that the only significant difference in ownership categories across SEC provisions is for the percentage of shares held by Indian financial institutions. Regulation S issuers have a significantly smaller percentage of their shares (18.64) held by financial institutions than firms making tandem offers (38.83) or firms issuing under Rule 144A (29.42). To the extent financial institutions add value by collecting and/or processing data or by establishing connections with international investors, the lower percentage of institutional holdings for Regulation S firms suggests that they are more susceptible to misvaluation because less or lower quality information is publicly available about them than about firms that issue under Rule 144A or in tandem offers.

The bottom panel of Table 3 shows that the size of the issue and the shares deposited with the depositary are lower, in aggregate and relative to shares outstanding prior to the offer, for Regulation S issues than for issues under the other SEC provisions. [16] The panel also shows that the total sample mean relative price was 0.92. On average, therefore, the price per share backing Indian GDRs was 8% lower than the price per share on the Bombay exchange six days prior to the issue date. This mean discount is consistent with the mean *discounts* in Wruck (1989); Hertzel and Smith (1993) and Kato and Schallheim (1993) which range from 11.5% to 20%. The table also indicates that the mean relative price is approximately equal for Rule 144A (0.89), Regulation S (0.99), and tandem offers (0.90).

4. Empirical results

This section presents three sets of results. The first set documents time series abnormal returns around announcement and issue dates for Indian firms in our sample. The second set examines cross-sectional relations between issue period abnormal returns, two information variables and a variable designed to capture the effects of market timing. The third set provides evidence on abnormal volume surrounding the GDR issue. [17]

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[16] Thirty-six announcement articles indicated intended uses of funds. Of these, 28 said funds would be used for investment or financing purposes but not both. Of these 28 announcements, 8 indicated investments in new lines of business or new plants in existing lines, 8 indicated modernization (or increased capacity) for existing assets, 11 indicated investments in new and existing assets, and one indicated a prepayment of high-cost debt. Of the eight announcements with combined investment and financing purposes, the most frequent financing use was the prepayment or avoidance of high-cost debt, and the investment purposes were split evenly between investments in new assets and modernization of existing assets.

[17] Of course, all the tests are subject to data availability and are influenced by the quality of the data that is available. A recent article in Economic Times suggests that Indian firms may be more reluctant to provide data to home-market authorities than to global investors. (See "Corporate India is Transparent Overseas, but Opaque at Home", Economic Times, 15 September 1999.)

4.1. Abnormal returns surrounding announcement and issue dates of Indian GDRs

We estimate daily abnormal returns for individual firms using a market model in which the BSE acts as the market proxy. Returns for individual firms and the market proxy are converted to US dollar returns using daily exchange rates available from *Bloomberg*. Parameter estimation extends from trading observations −200 to −26 relative to the announcement or issue date. Based on the estimated parameters, abnormal returns are calculated for observations −24 to +24. Like Miller (1999), we use days −1 to +1 as the announcement period. For consistency, we also use a three-day issue period. [18] We identify announcement dates by searching *Economic Times* manually from April 1992 (when the New Economic Liberalization Policy took effect) through the issue dates of the respective GDRs. Only the *first* announcement date is used, and only announcements that are not contaminated by other firm-specific events (e.g., dividends, earnings, capital investments, etc.) are retained. This yields an announcement sample of 32 firms. The mean (median) numbers of business days between the announcement and issue dates are 173 (98).

Given the calendar time clustering of GDR issues in Table 1, controlling for overlapping observations is important. Schipper and Thompson (1983) present one method of doing so. Event clustering is much more severe in their sample than in ours, however. Only three of the 32 *announcement* dates are shared by more than one firm (six firms in total share dates), and only three of the 60 *issue* dates are common across firms (seven firms in total share dates). To control for this less severe clustering, we run the analysis for the total sample first. Then, for all sets of firms that share dates, we eliminate firms whose names come earlier in the alphabet relative the other firms that share the same dates. Finally, we eliminate firms whose names come later in the alphabet. Since our inferences do not change when we control for shared announcement and issue dates, we report results based on the full sample.

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[18] Because of non-trading, these observations frequently do not occur on consecutive days even if the Indian market is open. We use data only if the stock in question trades on the particular day and only if Indian and world markets are both open. Because of differences in holidays, the Indian market is not always open when other world markets are and vice versa. An earlier version of this paper used 401 observations surrounding the event date and reported that, on average, 486 business days were needed to get the 401 trading days for the analysis. The additional 85 days, which came from adjustments for holidays in the Indian, European, and US markets and from non-trading in India, were not uniformly spaced across the 401 observation interval. One firm had a gap of 29 business days between two return observations. Though that was the largest gap, over half the sample had at least two successive return observations separated by nine business days. The reason for excluding data when US and European markets were closed was that some (unreported) market model regressions included the European index as a market proxy. We also synchronized Indian markets with foreign exchange markets so that local Indian returns could be converted into US dollar returns. Typically, the betas of Indian firms measured against the European index (appropriately adjusted for differences in trading time) were insignificant. The earlier regressions also included corrections for autocorrelated errors arising from non-trading. The correlation between the abnormal returns generated in the earlier version and this version of the paper is approximately 0.88. Events are included in the sample if returns are available for *any* day in the three-day issue period. When we restrict the sample to firms with returns on the actual issue date, we lose four firms. The results in the restricted sample are similar to the results we present.
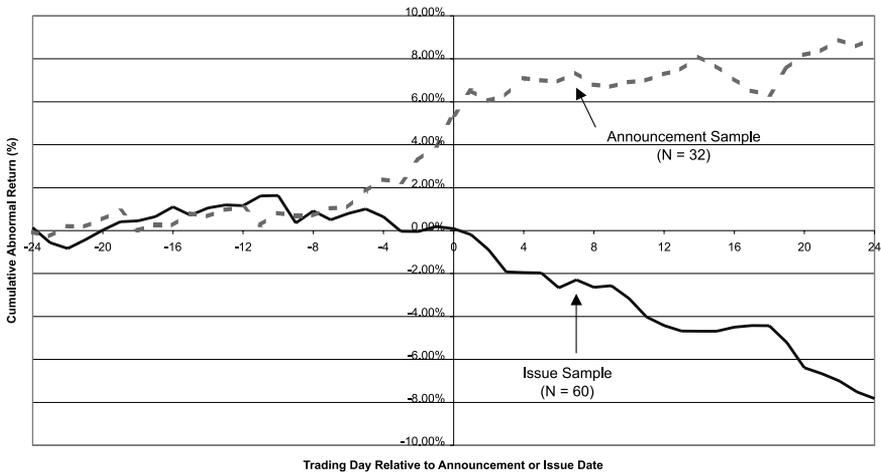
Fig. 2. Cumulative abnormal returns surrounding the announcement and issue of global depositary receipts by Indian firms. Abnormal returns for each firm are the residuals from market model regressions in which the parameters are estimated with trading observations from −200 to −26, relative to the announcement or issue date.

Fig. 2 graphs portfolio Cumulative Abnormal Returns (CARs) from observations −24 to +24 for the 32 events with announcement dates (dashed line) and for the full sample of 60 events with issue dates (solid line). In the sample of firms with announcement dates, the CAR reaches 3.28% by observation −2, 6.52% by day +1, and 8.97% by observation +24. The CARs are insignificant for the pre- and post-announcement periods, but significant at the 0.01 level ($t = 3.72$) for the announcement period. Non-parametric tests yield similar results. Our results are also robust to different methods of estimating abnormal returns.[19] This evidence suggests that announcements of GDR issues by Indian firms were not anticipated by the market, and that the positive news the announcements convey had a permanent positive impact on stock prices.

The mean announcement period abnormal return in our sample (3.24%) closely resembles the mean announcement period return in Miller's (1999) sample of publicly placed, capital-raising ADRs (3.23%).[20] Though outliers influence the mean

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[19] The mean ranks test statistic proposed by Corrado (1989), 3.27, is significant at th 0.01 level. Also, 20 of the 32 firms have positive three-day abnormal announcement period returns. The mean number of firms with positive three-day period abnormal returns between days −24 and +24, excluding the announcement period, is 15.67, and no other three-day period has as many as 20 firms with positive abnormal returns. Denominating returns in Indian rupees and calculating mean-adjusted abnormal returns to avoid estimating betas also produces results that are equivalent to the results we report above. Our results are also not subject to concerns raised by Bhattacharya et al. (2000) because all prices are transactions prices.

[20] It is also consistent with the magnitude of announcement period CARs reported in private placement studies by Wruck (1989, 4.50%); Hertzel and Smith (1993, 1.72%); Kato and Schallheim (1993, 4.98%) and Kang and Stulz (1996, 3.13%).

Table 4
Cumulative portfolio abnormal returns surrounding the announcement and issue dates of GDRs by Indian firms

Event period	Announcement period sample ($N = 32$)	Issue period sample ($N = 60$)
Days −1 to +1		
Cumulative portfolio mean abnormal return (%)	3.24	−0.24
t-Statistics	3.72**	−0.31
Minium abnormal return (%)	−6.83	−15.23
25th quantile	−1.66	−3.03
50th quantile	2.04	−0.43
75th quantile	7.48	3.45
Maximum abnormal return (%)	14.69	13.16

This table presents announcement and issue period mean abnormal returns for stocks of Indian firms that issued GDRs between 1992 and 1997. The abnormal returns for each firm are the residuals from market model regressions in which the parameters are estimated with trading observations from −200 to −26, relative to the announcement or issue date. The market index in the regressions is the Bombay "Sensex" Exchange from the PROWESS data base. However, returns are converted to US dollar returns using exchange rates available from *Bloomberg*. The t-statistic tests the null hypothesis that the mean abnormal return across firms equals zero.

** Significance at the 0.05 level.

in our sample, the median announcement period abnormal return in Table 4 is 2.04% and the 75th quantile abnormal return is 7.48%. Thus, the majority of the Indian firms in our sample experienced large positive stock price movements when they announced their intent to issue GDRs. We cannot conclude, therefore, that the ADRs that Miller (1999) examines produce greater wealth effects than the GDRs in our sample even though the ADRs in Miller's require higher-quality disclosures and provide enhanced liquidity, relative to the GDRs in our sample. This important finding suggests that privately placed GDRs convey good news to the market even when liquidity enhancements are not likely. [21] Thus, our findings do not appear to be explained by Amihud and Mendelson's (1986) liquidity hypothesis.

Merton's (1987) investor recognition hypothesis, however, still provides a plausible explanation for our results. To explore Merton's hypothesis and the hypothesis that GDRs help resolve home-market information asymmetries, we follow Foerster and Karolyi (1999) by examining CARs surrounding the GDR issue period. Issue period abnormal returns are important because in many instances the terms of the offer are not known until shortly before the issue date. The full sample portfolio CAR in Fig. 2 is insignificant in the pre-issue ($t = −0.02$) and issue periods

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[21] Though specific SEC provisions under which Indian GDRs would ultimately be issued were not disclosed in the initial announcement articles, the likelihood that these GDRs would trade in public US markets seems small, since the arrangement for the first such Indian GDR was finalized on 11 March 1999, when Infosys Technologies became the first Indian company to list its depositary receipts on NASDAQ. (See *Wall Street Journal* dated 31 August 1999 and *Economic Times* dated 23 February 1999.)

($t = -0.31$), but significantly negative in the post-issue period ($t = -3.56$). The post-issue decline in CARs (-7.77%) is consistent with the decline in CARs for foreign firms that listed DRs publicly in the US in Foerster and Karolyi's (1999) sample. [22]

The insignificant mean issue period abnormal return need not imply that the issue date conveys no information about the firms in our sample. Indeed, the interquartile range ($6.48\% = 3.45\% - (-3.03\%)$) in Table 4 implies the opposite. The mean abnormal return disguises the impact of the information conveyed on the issue date because large positive movements in some firms' stocks are offset by large negative movements in other firms' stocks. In part, this pattern may be explained by partial anticipation. For firms with prior announcements, investors may anticipate part of the information conveyed during the issue period. The partial anticipation argument is consistent with the (unreported) negative correlation (-0.387) between announcement and issue period abnormal returns for the 32 firms with announcement dates. Another potential explanation for the cross-sectional variation of issue period abnormal returns is that it reflects cross-sectional variation in important terms of the offer that are not revealed until the issue date. To gain additional insights into potential information conveyed by issue period abnormal returns, we now examine their cross-sectional determinants.

4.2. Cross-sectional determinants of issue-period abnormal returns

This section examines the relation between cross-sectional issue-period abnormal returns, two information variables, and a timing variable. The information variables are a modified market incompleteness factor similar to the variable Foerster and Karolyi (1999) adopted from Kadlec and McConnell (1994) and the relative price of the GDR. The market incompleteness factor is based on Merton (1987). The relative price is based on the notion that willing informed buyers certify the value of the underlying share by the price they pay for the GDR. The market timing variable is intended to capture the window of opportunity hypothesis discussed by Loughran and Ritter (1995). We explain each of these variables in more detail below.

Merton's investor recognition hypothesis states that investors can only invest in securities of which they are aware. Because the market for information is incomplete, firm-specific risk is priced in equilibrium. That risk relates to firm size and the shareholder base. If the shareholder base is broadened (e.g., through GDR issues), then market incompleteness declines, firm-specific risk decreases, expected returns decrease, and share prices rise. The change in the shadow cost of incomplete information resulting from this process is given in Kadlec and McConnell (1994) and Foerster and Karolyi (1999) by

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[22] Negative post-issue abnormal returns for Indian firms are also documented by Shah (1995) who examines abnormal returns around the issue of 46 Indian GDRs. In contrast to our findings, Shah finds a pre-issue runup predominantly for early issues. He interprets his findings to be consistent with mispricing of early GDRs, rather than with completing the market. Consequently, he does not examine the cross-sectional relation between abnormal returns and the market incompleteness factor. Nor does he examine the information content of the price of the GDR relative to the price of the underlying shares.

$$\Delta\lambda_i = \sigma_{\varepsilon i}^2 \text{SIZE}_i(1/\text{SHR}_{t+1} - 1/\text{SHR}_t),$$

where $\sigma_{\varepsilon i}^2$ is the firm-specific measure of the stock's return variance, SIZE_i is the relative size of the firm in the market, and SHR is the number of shareholders of record in the year before (t) and after ($t + 1$) listing. As the number of shareholders of record increases, investors become more aware of the firm i's stock, and (other things constant) the shadow cost of incomplete information declines resulting in higher share prices that reflect the lower cost.

In our tests, $\sigma_{\varepsilon i}^2$ is the residual variance of the abnormal returns over days -200 to -26, SIZE_i is the US dollar size of the Indian firm normalized by the S&P500, and the term in parentheses is the difference in the reciprocals of the number of shares outstanding after versus before the offer. Though shareholders of record and shares outstanding are not identical, data on shareholders of record for Indian firms are not available. If the number of shareholders of record changes proportionately with the number of shares outstanding, our measure should resemble the market incompleteness factor used in prior studies.

By definition, $\sigma_{\varepsilon i}^2$ is positive and the difference in the reciprocals of the number of shares outstanding after versus before the offer is negative. Therefore, the sign of $\Delta\lambda$ depends on the sign of SIZE_i. Because SIZE_i is the residual from a cross-sectional regression of the US dollar value of the Indian firm on day $t - 25$ against the level of the S&P500 Index on the same date, $\Delta\lambda$ can be positive or negative. Specifically, it will be negative for relatively large firms (with positive residuals) and positive for relatively small firms (with negative residuals).

Foerster and Karolyi (1999) use a similar method to measure SIZE_i. They argue that in cross-sectional regressions of abnormal returns on $\Delta\lambda$ a negative coefficient is expected. A negative coefficient implies that relatively large firms benefit more from the GDR (or ADR) issue than relatively small firms. Though different from the traditional notion that information asymmetries are more pronounced for small vis-à-vis large firms and that small firms benefit more than large firms from resolving the asymmetries, the investor recognition hypothesis deals with the *breadth* of information about a particular firm. In segmented markets, even large firms may be unknown in international markets. Moreover, even the large firms in our sample are small on an international scale. Therefore, large and small firms in our sample may both be obscure. If that is true, and if large firms are more poised than small firms to take advantage of investors' increased awareness of their potential, then large firms may indeed benefit more than small firms from GDR issues. On the other hand, large firms may be more well known than small firms and both may be equally well poised to take advantage of new opportunities arising from the GDR issue. If that is true, small firms may benefit more than large firms from the GDR issue. Thus, the sign of the coefficient on $\Delta\lambda$ remains an empirical issue which we examine below with two-tail tests.

The second information variable, relative price, is given by

Relative price = GDR offer price per share/home market price pershare$_{t-6}$.

The price informed GDR buyers pay on a per share basis relative to the pre-issue home-market price of the underlying share may certify share value for home-market investors if certification is credible. The costs purchasers bear to certify credibly are the potential illiquidity of the GDR, the restrictiveness of voting rights, and the lack of preferential cash flow rights. Given these costs, GDR buyers have heightened incentives to price the GDR correctly. If home-market investors understand these incentives, the relative price of the GDR should convey useful information to the market. Therefore, abnormal returns should relate positively with the relative price. Because the price QIBs pay is not available to home-market investors but only to the firm for shares deposited to back the GDRs, the predicted home-market response will *not* be mechanically induced.

Our final variable,

$$\text{World Ratio} = \text{BSE Index}_{t-25}/\text{World Index}_{t-25}$$

is the ratio from Fig. 1 of the Indian Index relative to the World Index 25 trading days before the GDR issue date. As Fig. 1 shows, most Indian GDRs were issued when Indian markets were performing well relative to other world markets. The mean (median) estimate of World Ratio in our sample is 1.27 (1.36). More than 75% of the estimates exceed 1.00. If this pattern represents undetected opportunistic behavior by Indian managers, issue-period abnormal returns may not relate to World Ratio. However, if GDR buyers make informed decisions and if the relatively high levels of the Indian market overstate the "true" values of the Indian firms, we expect informed investors to adjust the prices they pay which, in turn, would induce an inverse relation between issue-period abnormal returns and the world ratio variable.

Table 5 reports regression results of three-day issue period abnormal returns on the information and world ratio variables. The top panel presents coefficients and *t*-statistics for simple regressions in which we separately use each variable discussed above to explain issue-period abnormal returns. These simple regressions are run for each SEC provision and for the total sample. The total sample regressions first use issue period abnormal returns only, then issue period abnormal returns added to announcement period abnormal returns. Though we include intercepts in all regressions, we do not report them for the simple regressions because each would have a different intercept. Likewise, we do not report adjusted R^2 estimates and sample sizes for the simple regressions.

The coefficients (and White's (1980) *t*-statistics) in the total sample simple regressions that only use issue period abnormal returns indicate that abnormal returns relate positively with the relative price, but negatively with the market incompleteness factor and the world ratio variable. These coefficients are all significant at the 0.05 level. The results support the hypotheses that issue period abnormal returns reflect the benefits of enhanced investor recognition that reduces information asymmetries between Indian firms and global and home-market investors. The results also support the hypothesis that informed QIBs offset Indian manager's efforts, if they exist, to exploit a window of opportunity. Though the coefficient on World Ratio loses significance when announcement and issue period abnormal returns are added together

(in the simple and multiple regressions), the regressions provide little evidence that Indian shareholders benefit because managers seize a window of opportunity to issue GDRs. [23]

For the relative price and the world ratio variables, the total sample results for the simple regressions also apply to the smaller samples that use individual SEC provisions. For the market incompleteness factor, the results are driven primarily by firms in the Regulation S sample. This finding is consistent with our earlier discussion of Table 3 in which firms that use Regulation S have a significantly smaller mean percentage of shares held by financial institutions and, hence, are less widely recognized in the international investment community and are more susceptible to misvaluation than are the firms that make Rule 144A or tandem offers.

The multiple regression in the bottom panel of Table 5 also shows that the market incompleteness factor is not as powerful as the relative price and world ratio variables in explaining issue period abnormal returns. However, when announcement and issue period abnormal returns are summed, the coefficient on the market incompleteness factor (-3.90) is significant at the. 0.05 level ($t = -2.73$). Thus, there is suggestive evidence at least that Indian firms benefit from the increased awareness of international investors when GDRs are issued. [24]

4.3. Changes in volume surrounding the issue of Indian GDRs

We argue above that announcement and issue period abnormal returns associated with Indian GDRs result more from the resolution of information asymmetries than from liquidity enhancements. However, if information asymmetries create barriers to trade, resolving those asymmetries could induce greater trade. To test that

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[23] The correlation between announcement period abnormal returns and the world ratio variable is 0.486. This positive, significant relationship offsets the negative, significant relationship between issue period abnormal returns and the world ratio variable reported in regressions that use issue period abnormal returns only. The insignificant coefficient in regressions that combine issue and announcement period abnormal returns obscures the individual relationships. The positive correlation between announcement period abnormal returns and the world ratio variable may suggest that both measure the same thing, e.g., partial anticipation.

[24] To determine the impact of firm size on the pricing of the market incompleteness factor, we run regressions that, in addition to the relative price and world ratio variables, use the component parts of the market incompleteness factor in place of the composite factor to explain issue period abnormal returns and issue and announcement period abnormal returns combined. When we use only issue period abnormal returns, the coefficients on the relative price and world ratio variables retain their signs and significance but the coefficients on the component parts of the market incompleteness factor are all positive and insignificant. This finding holds regardless of whether we use the residuals from the cross sectional regression or the natural log of market value to represent $SIZE_i$. When we combine announcement and issue period abnormal returns as the dependent variable, the coefficients on $\sigma_{\varepsilon i}^2$ and the change in shareholders of record are positive and significant at the 0.05 level, but the coefficient on $SIZE_i$ is negative and insignificant, regardless of how firm size is measured. Thus, how size is measured is not as important as whether the dependent variable includes or excludes announcement period abnormal returns in determining why the market incompleteness factor is priced. However, the impact of firm size itself remains unknown because the coefficients on $SIZE_i$ are insignificant in all regressions.

Table 5
Regressions of three-day abnormal issue period returns of Indian firms that issued GDRs on the change in a modified market incompleteness factor, the relative price of the GDR compared with the underlying stock, and a market timing variable

Sample	Constant	Market incompleteness factor	Relative price	World ratio	N Adj. R^2
Simple regression coefficients (*t-statistics*)					
Rule 144A	Na	−2.23	0.10	−0.11	Na
		(−1.19)	(2.03)**	(−3.47)**	
Regulation S	Na	−2.73	0.3	−0.2	Na
		(−1.72)*	(5.91)**	(−3.69)**	
Tandem	Na	−1.95	0.16	−0.08	Na
		(−1.16)	(2.30)**	(−2.93)**	
Total sample (issue period ARs only)	Na	−2.07	0.15	−0.11	Na
		(−2.46)**	(2.97)**	(−5.34)**	
Total sample (issue and announcement period ARs)	Na	−4.85	0.09	0.01	Na
		(−3.92)**	(2.31)**	(0.28)	

Multiple regression coefficients (t-statistics)

Total sample (issue period ARs only)	−0.0558	−1.14	0.17	−0.08	47
	(−0.95)	(−1.46)	(4.45)**	(−3.24)**	(0.464)
Total sample (issue and announcement period ARs)	−0.1808	−3.90	0.18	0.04	27
	(−1.61)	(−2.73)**	(3.41)**	(−0.72)	(0.220)

The abnormal returns for each firm are the residuals from market model regressions in which the parameters are estimated with trading observations from −200 to −26, relative to the issue date. The market index in the market model regressions is the Bombay "Sensex" Exchange from the PROWESS data base. Returns are converted to US dollar returns using exchange rates available from *Bloomberg*. The change in the market incompleteness factor is the product of the residual variance of the abnormal returns over days −200 to −26, the US dollar size of the Indian firm normalized by the S&P500, and the difference in the reciprocals of the number of shares outstanding after versus before the offer. The relative price variable is the US dollar per share price of the GDR divided by the US dollar price of the underlying share six days before the issue date. The world ratio variable is the ratio of the levels of the Bombay Stock Exchange Index and the World Index from Fig. 1, 25 days before the issue date. Because of data constraints, our market incompleteness factor resembles, but is not identical with, the factor used by Kadlec and McConnell (1994) to capture Merton (1987) notion of changes in the shadow cost of information. Instead of using differences in the reciprocals of the number of shares outstanding as we do, Kadlec and McConnell use differences in the reciprocals of the number of shareholders of record after versus before the offer. To the extent the number of shareholders of record changes proportionately with changes in the number of shares outstanding, our measure should resemble theirs. The top panel presents coefficients and *t*-statistics for simple regressions in which we use each variable discussed above separately to explain issue-period abnormal returns. These simple regressions are run separately for each SEC provision and for the total sample. Though we include intercepts, we do not report them because each simple regression would have a different intercept. For the same reason, we do not report the adjusted R^2 estimates and sample sizes for the simple regressions. White (1980) heteroskedasticity consistent standard errors are used to compute *t*-statistics. Tests of the relation between issue period abnormal returns and the relative price, the market incompleteness factor, and the sequence variable are two-tail tests.

* Significance at the 0.10 (0.05) level.
** Significance at the 0.05 level.

hypothesis directly, we now examine abnormal home-market volume before and after the GDR issue. Tkac (1999) suggests that abnormal volume can be isolated by comparing turnover for the firm to turnover for the market and adjusting for firm-specific attributes such as institutional ownership, firm size, the availability of options, and inclusion of the stock in a major index such as the S&P500.

Though Tkac's approach is appealing, we use a simpler approach for the 36 firms in our sample with volume data. [25] These data are limited, but they may shed light on whether the GDR *issue* contains information beyond that contained in the announcement articles, despite the insignificant CAR in the issue period. They also provide direct evidence on potential liquidity enhancements from the GDR issue. [26]

To measure abnormal volume around the issue date for each firm, we subtract the volume estimate on a given day from the mean of the volume estimates across days −200 to +200. We then divide each estimate of mean-adjusted volume by the standard deviation of the volume estimates between days −200 and +200. If the number of shares outstanding remains constant over the estimation period, abnormal trading volume as we measure it is the same as abnormal turnover.

Fig. 3 portrays the abnormal volume for firms in this sample. In the days immediately preceding the issue, abnormal volume increases. However, the largest spike is on the issue date itself. By construction, expected abnormal volume is zero. However, the issue-date portfolio average is 1.36. The next largest estimate (for observation −16) is 0.79. The standard deviation of the portfolio abnormal volume across the 401 trading observations is 0.20. Thus, the portfolio issue date abnormal volume is approximately seven standard deviations from its expected value. According to Karpoff (1986) and Kim and Verrecchia (1991), investors trade when they revise their beliefs differentially. Recent tests supporting this hypothesis are reported in Bamber et al. (1999). Though our purpose differs from the purpose of these papers, Fig. 3 suggests that the GDR issue date conveys relevant information for Indian firms.

Fig. 3 also sheds light on the relation between abnormal volume before and after the issue date. Excluding days −24 to +24, the mean pre-issue abnormal volume is 0.011, and the mean post-issue abnormal volume is −0.065. Though insignificant, this difference shows that home-market volume, and by extension liquidity, declines slightly after GDRs are issued. Thus, home-market price effects associated with GDR issues are unlikely to be caused by enhanced liquidity.

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[25] For these 36 firms, the mean (median) number of days with volume data available across the 401 observations surrounding the issue period is 354 (400). The minimum number of days is 195. For any given day, the mean (median) number of sample firms with volume data is 32 (32). The minimum number of firms is 26.

[26] Kadlec and McConnell (1994) use the bid–ask spread to control for changes in liquidity. However, they acknowledge (in their Footnote 11) that trading volume is also appropriate. They use bid–ask spreads because volume data for the NYSE and NASDAQ are recorded differently and are not easily reconciled. We use trading volume because bid–ask spreads do not exist in Indian markets because Indian markets do not have market makers.
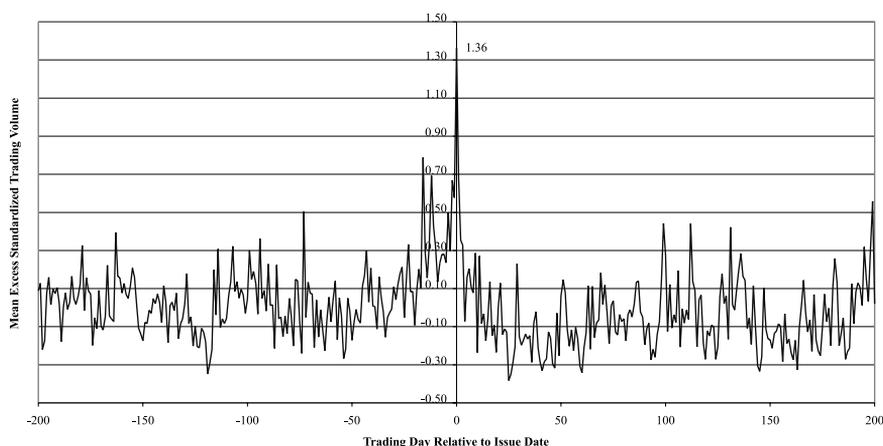
Fig. 3. Mean estimates of standardized abnormal trading volume in trading time relative to the issue of GDRs by Indian firms. Standardized excess trading volume for each firm is the difference between volume on the trading day in question and mean trading volume for that firm over days from −200 to +200 divided by the standard deviation of trading volume over that same period. The mean estimates of standardized excess trading volume are for the sample of 36 firms with volume data available. However, not all 36 firms have data available on every day.

Section 2 argues that Rule 144A and Regulation S GDRs are more liquid than traditional private placements. Thus, one might argue that any liquidity provided by GDR trades should also be considered in our analysis. However, Section 2 also indicates that restrictions placed on FIIs and home-market investors prevent GDRs and the underlying shares from being perfect substitutes. Thus, the liquidity *for home-market investors* need not be enhanced even if QIBs can trade GDRs among themselves. Despite these arguments, we compare turnover for shares traded in Bombay with turnover for the GDRs that trade in Frankfurt, London, and/or Luxembourg. The comparison is reported in Table 6. The 11 firms in the table are a matched-pair subset of the 36 firms from Fig. 3 for which DOSM GDR volume data are available from *Bloomberg* between trading observations from 0 to +200.

Since some GDRs trade on multiple DOSM, turnover for shares and GDRs is measured relative to the number of shares outstanding prior to the issue. GDR turnover is based on *Bloomberg* volume estimates for *all* DOSM for which data are available through time. On any particular day for any particular GDR, *Bloomberg* reports volume for only one DOSM. Thus, our GDR volume estimates do not aggregate volume across DOSM for the same day even though they do aggregate volume across DOSM over time. Since *Bloomberg* reports volume for only one DOSM on any given day and since we do not have PORTAL data, GDR turnover estimates in Table 6 are conservative. [27]

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[27] Conversations with the Office of the Chief Economist at the SEC confirm that PORTAL data are proprietary and, therefore, available only to QIBs.

Table 6
Matched-pair comparisons of turnover and trading frequency of shares and GDRs issued against those shares for 11 Indian firms for which volume data are available for both the shares and the GDRs

Summary statistic	Total sample	Days 0–50	Days 51 to 100	Days 101–150	Days 151–200
Mean turnover per day traded (%)					
Indian shares	0.3073	0.0802	0.3212	0.2925	0.5935
Indian GDRs	0.084	0.1073	0.0432	0.0586	0.0537
Mean number of days traded					
Indian shares	190.7	47.8	49.8	47.6	50
Indian GDRs	71.7	28.2	24.8	29.5	26.1
Number of securities in sample					
Indian shares	11	11	11	11	10
Indian GDRs	11	6	6	8	9

This table summarizes the turnover and frequency of trade for equity shares and Global Depositary Receipts for 11 Indian firms for which volume data are available for shares traded in Bombay and the GDRs traded on DOSM. Volume for the shares comes from the PROWESS data base of the Center for Monitoring Indian Economy (CMIE). Volume for the GDRs comes from *Bloomberg*. Data are summarized for 201 days, including the date the GDR was issued and the 200 days following the issue. Turnover for the shares and the GDRs is measured relative to the number of shares outstanding prior to the issue. Turnover for the GDRs is adjusted for the ratio of shares to GDRs in the issue. For example, if a GDR is backed by five shares, we multiply the GDR volume by five and divide by the number of shares outstanding to measure turnover.

Turnover for GDRs is adjusted for the ratio of shares to GDRs in the issue. If a GDR is backed by five shares, for example, we multiply GDR volume by five and divide that product by the number of home-market shares outstanding prior to the offer. The total number of shares represented by the GDR is smaller than the number of home-market shares available for trade. For this reason, Table 6 understates GDR turnover relative to GDRs available for trade. Nevertheless, expressing turnover of both the underlying shares and the GDRs relative to the same base allows a consistent estimate of the number of shares traded in and outside of India.

The table divides days 0 to +200 into four segments of 50 (51) days each. Besides turnover, the table also reports the average number of days traded and the average number of securities that trade in each period. For the entire sample, the turnover per day, given that the securities trade, is approximately one-fourth as large for GDRs as for the underlying shares (0.0804% versus 0.3073%). This ratio is consistent with the average number of shares issued relative to shares outstanding from Table 3 (24.30%). However, in two of the four fifty-day periods only six of the 11 GDRs trade, and the number of days on which GDRs trade in each period is approximately half as large as the average number of days on which the underlying shares trade.

Thus, despite being more liquid than traditional private placements, Rule 144A and Regulation S GDRs still have limited liquidity. These limitations, combined with the restrictions on voting rights and the lack of superior cash flow rights, could impose substantial costs on purchasers. However, purchasers are QIBs who, because of their presumed ability to process information, are permitted to buy and sell otherwise restricted securities. That GDRs are purchased and traded in markets

outside India increases international investors' awareness of the Indian firms. That QIBs are the purchasers makes the relative price informative to home-market investors. That the relative price also adjusts for current market conditions suggests that QIBs are not fooled by managerial motives, if they exist, to time the market.

5. Conclusion

We examine announcement and issue period stock price effects of Indian firms that issued GDRs between 1992 and 1997 under Rule 144A and/or Regulation S. Indian firms have dominated both the number and dollar volume of this market over this period. The announcement period mean abnormal return in our sample is positive and significant and similar in magnitude to mean announcement period return in Miller's (1999) sample of publicly placed, capital-raising ADRs. This finding suggests that GDR issues can convey positive information without increasing liquidity and without the higher-quality disclosures of public placements.

Mean issue period abnormal returns are insignificant in our sample. However, issue period returns relate inversely to a modified market incompleteness factor and the world ratio variable and positively with the price of the GDR relative to the price of the underlying stock. The findings support the hypotheses that GDR issues help resolve information asymmetries between global investors and Indian firms and between Indian firms and local investors in their own markets. They also support the hypothesis that informed investors take account of the relative levels of Indian and world markets in setting GDR prices. Announcement and issue period abnormal returns are unlikely to be caused by enhanced liquidity for home-market investors, given the absence of significant changes in volume of home-market shares and given the restrictions pertaining to which foreign investors can hold Indian shares and to how much they can hold.

Acknowledgements

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