Indian Stock Market Reaction to International Cross-listing: Evidence from Depository Receipts

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and

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The present study investigates the impact of cross listing of ADRs on the Indian stock market for the period June 2004 to July 2009. Average abnormal returns and cumulative average abnormal returns are calculated for the [-25, +25] event window, with the ADR listing date being the event date. The result indicates a significant negative abnormal local market return on the ADR listing day. Six out of nine companies shows increased volatility of local returns after the cross listing. We can conclude that ADR listings have no tangible benefit impact to the local shareholders.

Key words: Cross-listing, ADRs, event study

Introduction

An integration of world financial market has been the distinct feature of the recent global development. The last two decades has witnessed acceleration in financial globalization represented by an increase in cross-country foreign assets. Technological progress and the liberalization of capital flows have fostered considerable competition among global stock exchanges for equity listings and trades. Cross-border listings have gained in importance over the past few decades as many companies have become more international in their orientation. The reason why so many firms recently list their shares for trading on more than one stock exchange is a segmentation of capital markets. According to Moffett et al. (2003), a national capital market is segment if the required rate of return on securities in that

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market differs from the required rate of return on securities of comparable expected return and risk that are traded on other national securities market. It is usually expected that a Depository Receipts (DR) listing improves liquidity of the company's stock, as the potential investors' base is extended, the visibility of the company both in DR and local markets is enhanced and cross border trading is enabled. International listings provide firms with improved access to global capital, reduced risk exposure, enhanced visibility, liquidity and investor base (Doukas and Switzer, 2000; Foerster and Karolyi, 1999; Lins, Strickl and Zenner, 2003; Miller, 1999; Mittoo, 1992). Another study that is in line with this school of analysis is of Doidge, Karolyi, and Stulz (2004), which argues that high-growth firms are more likely to cross-list, as controlling shareholders are more likely to find it optimal to limit their expropriation of minority shareholders in exchange for lower costs of capital in financing the firm's future growth opportunities. It is argued that cross-listing on a market with stricter disclosure requirements is an effective countermeasure to information asymmetry (Bailey,Karolyi and Salva, 2006; Cantale, 1996; Fuerst, 1998; Moel, 1999), and that the improved information environment will further lead to an increased analyst coverage, reinforced forecast accuracy, and thereby, a substantial rise in stock valuation (Baker, Nofsinger, and Weaver, 2002; Lang, Lins, and Miller, 2003).On the other hand, empirical evidence suggests that shares of cross-listed firms tend to experience abnormally high returns prior to their foreign listing and shortly thereafter. Longer-term performance varies greatly across companies (Chouinard, 2004).

Empirical studies suggest that the cost of equity capital declines following a foreign listing (Karolyi 1998; Stulz 1999; Errunza and Miller 2000).Some studies argue that trading in the stock shifts to the DR market and they worry about the impact on the overall liquidity of the local market. Also the price of underlying shares in the local market rarely remains unaffected by the DR issue. Starting in late 90s, international cross listing lost some of its momentum. By the end of 2002, the number of internationally cross listed stock had dropped to less than 50% of what it was in 1997 (Karolyi, 2006). During all these periods, irrespective of whether international cross listing was in vogue or not, research on this practice was relatively active and the focus was on the cross listing of stocks. Alexander, et al. (1987) and Errunza, et al. (1985) are among the first to study cross listing. They argue that by listing their stocks in foreign countries firms are able to reduce their risk exposures and thereby offer the investors a greater amount of diversification in their portfolios.Doidge, Karolyi, and Stulz (2004) point out that many companies have not been cross-listed yet. Moreover, Financial Times (2005) point out that a number of European companies already listed on the U.S. market are considering whether to terminate their listing, arguing that the costs outweigh the benefits, and actually claiming that there may be no benefits at all. These disputes lead researchers to focus attention on the costs and benefits associated with this decision. The impact of the Depositary Receipts on the development of domestic stock market is very important to analyze nowadays, due to rapid grow of DRs also in many emerging markets. The rest of this paper is organized as follows. Section II reviews previous empirical research. Research methodology and sample specification is discussed in section III. We present empirical results in section IV. A conclusion is drawn in section V.

Literature Review

An extensive body of literature deals with the valuation effects of cross-listing on the underlying stocks. When considering the effects of international cross-listing, the degree of integration between local and foreign markets plays an important role. The concern among policy makers in emerging markets is that cross-listing will divert order flow from their domestic markets to more developed foreign markets, lowering economic growth. Also, the more integrated global economy leads to increased possibility of contagion during a downturn. The literature on international cross-listings focuses on three main issues. First, many studies have examined the effects of a cross-border listing of a stock in terms of excess returns, liquidity, and risk. Doukas and Switzer (2000) find a significantly positive stock market reaction to the announcement of a listing in the U.S. by 79 Canadian firms in the period 1977-1997. This is consistent with the hypothesis that international listings lead to a decrease in the risk premium of firms operating in mildly segmented markets. Pagano, Röell, and Zechner (2002) find that companies that list abroad are relatively large and have a high level of foreign sales and R&D spending. A number of recent studies employ high-frequency data of cross-listed securities on different exchanges to analyze price discovery of internationally-traded firms. Grammig, Melvin, and Schlag (2000) examine intra-day quote data of three large German firms at the Frankfurt Stock Exchange and the NYSE. Their results indicate that price discovery mainly occurs in the home market. Lowengrub and Melvin (2000) examine volume and volatility before and after international cross-listing using intraday data for the 23 German firms that issued ADRs between 1991 and 1997. The intraday volatility pattern became flatter after the cross-listing. Podpiera (2001) extends the earlier model of Domowitz et al. (1998) and estimates it using data on stocks from Central Europe (Czech Republic, Hungary and Poland) that are cross-listed on the London Stock Exchange. He finds that for 7 out of 10 stocks volatility increased after the GDR listing.

In a study involving market timing, Schaub and Highfield (2006) conclude that emerging market ADRs issued during a bull market under-perform the S&P 500 Index after a 36-month holding period, while those issued during a bear market outperform the market and developed market ADRs under-perform the market throughout the study period. Callaghan, Kleiman and Sahu (1999), find that ADRs significantly outperform the stock market index during short-term and long-term holding periods from the date of issue. Doidge, et al. (2004) document higher and positive cross listing premium for stocks from countries with poor investor protection. Additional support is also provided by Ayyagari (2004) and Doidge, Karolyi, Lins, Miller and Stulz (2005). Opponents of the bonding hypothesis (Siegel, 2005, Burns, Francis and Hasan, 2007) argue that a higher cross listing premium in the U.S. market may be due to the fact that the U.S. regulators have not effectively enforced the law against the cross-listed foreign firms. Macey, O'Hara and Pompilio (2005) argue that studying the delisting is very important and describe the domestic delisting process in the U.S markets. The most cited reason for this exodus is the passage of the Sarbanes-Oxley (SOX) Act in 2002. It is argued that this Act has increased the cost of listing in the U.S. Some studies, however, have provided evidence against this argument by showing that the foreign listing in the U.S. did not decrease in the two years following the passage of the SOX (Doidge, et al., 2008, Sarkissian, et al., 2008). It should be noted that all of the studies focus on delisting

from U.S. markets and none of them so far has looked into the general consequences of overseas delisting for investors. The growth of global markets and the availability of American Depository Receipts (ADRs) create an opportunity for institutional investors and individuals to expand portfolio diversification and reap profits. According to Surz (2007), ADRs outperform the S&P 500 Index by 16 percent.

If the depository receipt is traded in the United States of America (USA), it is called an American Depository Receipt, or an ADR. If the depository receipt is traded in a country other than USA, it is called a Global Depository Receipt, or a GDR. It represents a certain number of underlying equity share. ADRs and GDRs are not for investors in India – they can invest directly in the shares of various Indian companies. But the ADRs and GDRs are an excellent means of investment for NRIs and foreign nationals wanting to invest in India. By buying these, they can invest directly in Indian companies without going through the hassle of understanding the rules and working of the Indian financial market – since ADRs and GDRs are traded like any other stock. NRIs and foreigners can buy these using their regular equity trading accounts. Though the GDR is quoted and traded in dollar terms, the underlying equity shares are denominated in rupees. GDR are issued through the under writers, who arrange to sell the GDR to the investors. After the final issue, a depository is chosen and the company registers the equivalent equity shares of GDR issue in the name of this depository. Though the shares are registered in the name of this depository, the physical possession of the shares is with the local custodian, who acts as the trustee of the depository. The depository subsequently issues the GDR to the under-writer who distributes these negotiable instruments to the investors. So it is evident that the Indian capital market has remarkably changed through the issue of GDRs and able to mobilize considerable foreign investment.

The capital market has become very active and Financial Institutions (FIs), FIIs, Asset management companies have shown increasing interest in investing in India. With a view to achieve the goal, Euro-issue is taken as one of the viable alternatives. GDR is envisaged as an innovative and easily accessible route to reach the international capital market by Indian corporate sector. The response of foreign investment flows to reforms was to a great extent encouraging. It clearly shows that the sizes of euro-issues have grown tremendously just after new economy policy measures announced. A GDR is a dollar denominated instrument listed and traded on foreign stock exchanges like NYSE (New York Stock Exchange) or NASDAQ (National Association of Securities Dealers Automated Quotation) both. The Reliance Industries Ltd, in May 1992, made the first GDR issue of $150 million. The first Indian GDR issues made by Reliance Industries and Grasim Industries were at a premium. There are 22 ADR issues from India between 2004 and 2009.Despite the strong supports for the presence of cross listing premium, empirical evidence to date has been mixed in documenting the resultant benefits of international listings.

The empirical inconclusiveness of the cross listing benefits gave birth to the first motivation of our research study. Our study is important for several reasons. Our study is expected to extend prior research and provides new insights about the implications of cross listing. Secondly our research examines the stock market reaction to ADR issue by comparing returns and their variances before and after the listing date. However no research has been conducted on pure cross listing of Indian

shares, therefore the findings of the present study are expected to add a fuller dimension to the literature in this area.

Data Source and Methodology

We have taken nine companies that were listed in foreign market and continued to trade in their home market. We collected stock market closing daily prices for nine companies during the period June 2004 to July 2009 that issued ADRs. The listing date marks the time when effects on the underlying stock can be realized through actual ADR trading. It appears that information revealed in the transactions matters more than the announcement of future trading opportunities. The regular approach to getting announcement dates for cross-listed companies involves searching for the first news release on that matter. Since we are looking at American Depositary Receipts here and most of the Indian company's ADRs are either Rule 144a program or Regulations depositary receipts. We have included both the types of ADR issue into our calculation. Each company is required to have return data at least 175 days before and 175 days after the listing date. This relatively small window is justified by availability of the local stock data. Only nine companies had a window of this length. We used different news websites and finance websites to find announcements dates for the companies in our sample. Unfortunately, the results were conflicting, with some announcement dates which were occurring after the actual trading dates. Hence, we use the actual listing date as the event date in this paper. Listing dates were obtained from the Bank of New York database on ADRs. Closing prices for each stock as well as the national market index are compiled from the National Stock Exchange of India Ltd (www.nseindia.com).

Methodology

We employ the standard event study methodology of Fama, Fisher, Jensen and Roll (1969) to calculate the abnormal returns during the period surrounding the cross listing dates. Since Log normal returns are better predictor for stock and market return, we calculated the local returns as follows:

$$R_t = \ln(P_t) - \ln(P_{t-1})$$

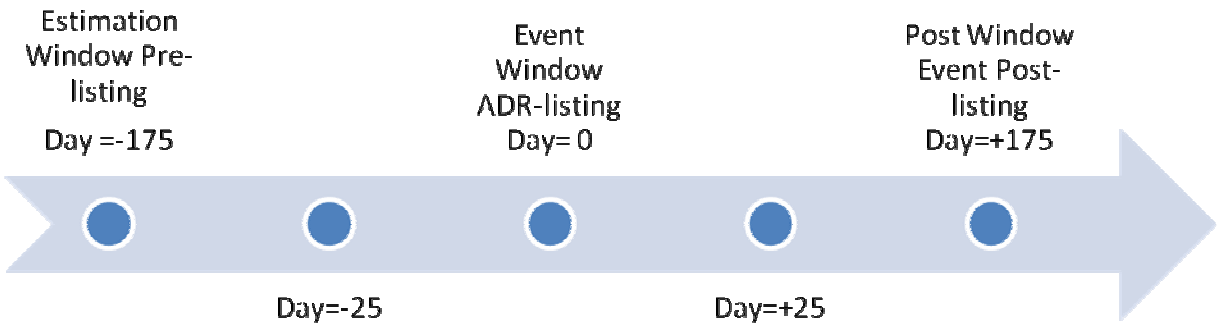
Where, P_t is daily closing price.

The effect on the stock price is measured by the standard market model event study methodology. The model describes the linear relationship between the return of the security to the return of the market portfolio. To measure abnormal return we estimate a market model for each firm using local stock returns. With the listing date defined as Day 0, the market coefficients are estimated in the pre-listing period: Day –175 to Day –26. The next section describes the market model in detail.

Following the technique used by Jayaraman, Shastri and Tandon (1993), 51 days around listing are excluded to allow for a permanent effect. It is typical for the estimation and the event windows not to overlap. This design provides the estimators for the parameters of the normal return model that are not influenced by the event-related returns. Including the event window in the estimation of the parameters of the market model could lead to the event returns having a large influence on normal return measure. In this situation, both the normal and abnormal

returns would reflect the impact of the cross-listing. This is problematic since the methodology implicitly assumes that the event is exogenous with respect to the change in market value of the security. Figure 1 shows the non-overlapping windows.

Figure- 1 Time Line for the Cross-listing



Abnormal returns in the event window are determined by the prediction errors from the market model. Coefficients from the pre-listing model are used to calculate abnormal returns from Day –25 to Day +25. Abnormal returns are then averaged across firms (average abnormal returns) and across time (cumulative abnormal returns).

Abnormal Returns

The abnormal return has been calculated for each stock on a daily basis by subtracting expected return from the actual return. Abnormal return for each day is consolidated for all companies and average abnormal return is calculated. Market Model Abnormal Return (AR) for the "ith" firm on day "t" given by

$$AR_{it} = R_{it} - (\alpha_1 - \beta_1 R_{mt})$$

Where α_1 and β_1 are the estimated coefficient

$$\alpha_1 = \bar{r}_i - \beta_i \bar{r}m$$

$$\beta_1 = \mathrm{cov}(r_i, r_m) / \mathrm{var}(r_m)$$

The parameters α_1, β_1 have been estimated from the following OLS regression of the event firm's returns on the index returns during the estimation period for firm i.

$$R_{it} = \alpha_i + \beta_i R_{mt} + e_{it}$$

Where

R_{it} is the rate return of the stock i on the day T

R_{mt} is the rate of return of the market index (m) on the day T.

e_{it} is the error term of the stock is on the day T, having zero mean $\sigma^r e_i$ variance. Under the assumption of joint normality and independently and identically distributed returns, the error of the regression is well behaved, i.e.,

E (e_{it}) = 0 and VAR (e_{it}) = $\sigma^r e_i$

The cumulative effect of the event over a specified number of days is determined by calculating cumulative average abnormal returns or CAARs.

CAAR = $\sum$ AAR_t

Where AAR_t = average abnormal return for each time period

$AAR_t = \frac{1}{N}\sum AR_{it}$

i = 1

Where N = Number of Securities studies t is defined in trading days relative to the event day and ARR_t denotes the average of the abnormal return crossing events. The event window extends from 25 days prior to the event day to 25 days after the event day. Number of days in the market regression is 150 (L=150).

Test Statistics

To judge the statistical significance of the abnormal returns, the Dodd and Warner (1983) methodology was then used to compute standardized abnormal returns and their test statistics. For each security i, the daily abnormal return AR it is standardized by the square root of its estimated forecast variance to determine its standardized abnormal return

$$SAR_{it} = \frac{AR_{it}}{Sit}$$

Where SAR_{it} is the maximum likelihood estimate of the variance of AR_{it} and

$$Sit = \frac{\sqrt{St^{2}\left[1+\frac{1}{L}+\left(R_{mt}-\hat{R}_{m}\right)\left(R_{ust}-\hat{R}_{us}\right)\right)}}{\sum_{k=1}^{L}\left(R_{mk}-\hat{R}_{m}\right)\left(R_{usk}-\hat{R}_{us}\right)}$$

S_{it} is the estimated residual variance from the market model regression for security i,R_{mt} is the local market return on day t,R_{ust} is the US market return on day t, $\hat{R_m}$ is the mean local market return over the L days used to estimate the regression, $\hat{R_{us}}$ is the mean return on the US market index over the L days used to estimate the regression. For each day of the event period, a test statistics Z_t

$$Z_t = \sum_{i=1}^{N} SAR_{it} \sqrt{1/N}$$

Cumulative average abnormal returns were calculated as follows:

$$CAR_t T = \sum_{i=1}^{N} AR_{it}$$

Where T is the number of days in the accumulation period

Cumulative test statistics are calculated as follows:

$$CZ_t = \sum_{i=1}^{N} Z_t \sqrt{1/T}$$

The event window extends from 25 days prior to the event day to 25 days after the event day. Number of days in the market regression is 150(L=150)

Next we compare the volatilities of stock returns before and after the ADR listing. The window used for the before period is [–175, –26] days, and [+26, +175] days for the after period. Variance ratios are computed as:

Ratio = (VAR after) / (VAR before)
Thus, if the ratio is greater than one, the variability of stock returns increased after the ADR introduction, and vice versa.

Empirical Results

Descriptive statistics pertaining to average abnormal returns and cumulative abnormal returns is presented in table-1. All returns are calculated as the first difference of the log of the daily closing price. it is seen that AAR follows more or less normal distribution with an skewness of +0.26 and a kurtosis of +0.46. But CAR has a skewness of -0.55 and kurtosis -0.07. This gives a very interesting result that negatively skewed that more cumulative abnormal return on the right side of the curve and kurtosis is almost zero. The kurtosis for all the stocks is more than 3 (excess kurtosis), thus they are leptokurtic, i.e., the frequency distribution assigns a higher probability to returns around zero as well as very high positive and negative returns. The Jarque-Bera statistic for all the variables is significantly greater than zero (due to the leptokurtic data). Thus, Jarque-Bera statistics shows that all the series are leptokurtic, exhibit non-normality and indicate the presence of Heteroscedasticity.

Table-1 Descriptive Statistics

	AAR	CAAR
Mean	0.000297	0.191723
Std. Dev.	0.014283	0.088076
Skewness	0.260825	-0.548758
Kurtosis	3.432235	2.917091
Jarque-Bera	6.712077	17.71697
Probability	0.034873	0.000142

Table 2: Variance Ratios for the sample companies

Company	Variance Ratio
Eveready	0.901113888
Financial Technologies	1.308197427*
Gammon	28.95403201*
India bulls Financial	0.715136173
India bulls Real Estate	0.92179325
India bulls Securities	1.234782411*
Man Industries	2.719942546*
NEPC India	1.697619037*
Rolta	1.447977166*

Figure 1: Variance Ratio for different companies

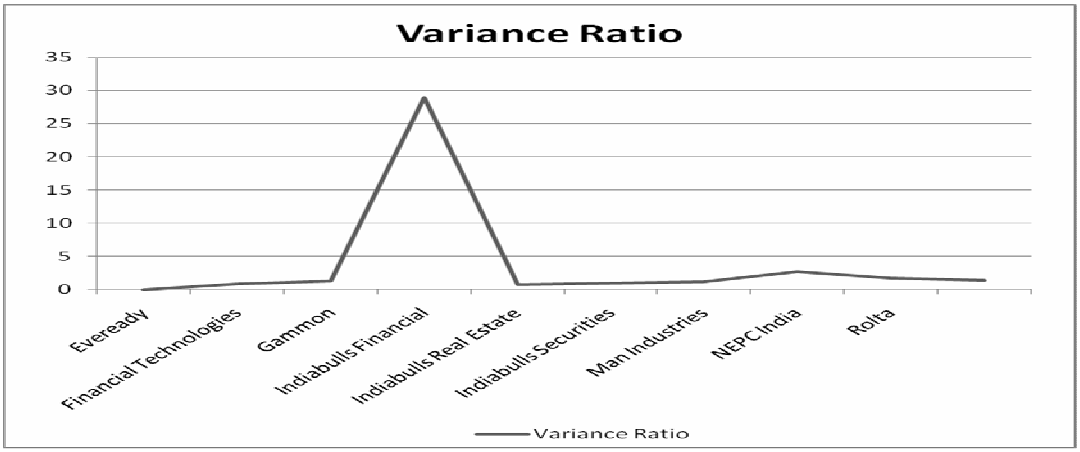


Table 2 and Fig-1 shows the variance ratios of nine companies. Six of the variance ratios are greater than one, and most of them are statistically significant based on an F-ratio test. This means that most of the companies in the sample experienced a greater volatility of returns after the ADR listing. Three firms have variance ratios less than one. The return volatilities did not change consistently for the whole sample, with most companies experiencing an increase in volatility of local stock returns. Six of these ratios are statistically significant at the 5% level of confidence implying that

return variance for the six companies in the sample reduced after the listing. The result can be attributed to low degree of information transparency between the local and the US markets.

Table 3: Average abnormal return (AAR) and Cumulative abnormal return (CAR)

Day	$AAR_{i,t}$	Z test	$CAR_{t,T}$	Z test
-150	0.024777	0.28184	0.076355	0.025451569**
-140	0.003529	0.045212**	0.116458	0.038819425**
-130	0.028746	0.280952	0.152904	0.05096803**
-120	-0.00634	-0.05362**	0.176747	0.058915531**
-110	-0.00266	-0.02702	0.200054	0.06668459**
-100	-0.00176	-0.03985**	0.235234	0.078411168***
-90	0.025096	0.23248	0.28355	0.094516548***
-80	0.021265	0.161285	0.343427	0.114475597
-70	-0.0181	-0.17107	0.27488	0.091626698***
-60	0.004053	0.026893*	0.26885	0.089616683***
-50	0.006665	0.029841**	0.301139	0.100379706***
-40	-0.00303	-0.01425*	0.245986	0.081995471***
-30	-0.00663	0.048092**	0.203446	0.067815337**
-20	0.001939	0.020761**	0.205732	0.068577221**
-15	-0.02494	-0.24886	0.190075	0.063358176**
-10	0.009921	0.10148***	0.195786	0.065262162**
-5	0.015811	0.130964	0.247895	0.082631727***
0	-0.00206	-0.01352*	0.24299	0.080996787***
5	0.006027	0.061176***	0.310878	0.103625891***
10	-0.00075	0.00566*	0.312929	0.104309608***
15	0.003501	0.038054**	0.289382	0.096460738***
20	-0.00788	-0.07389***	0.314117	0.104705715***
30	-0.02363	-0.22063	0.282475	0.094158316***
40	-0.01748	-0.16542	0.280156	0.093385233***
50	-0.03126	-0.34116	0.226509	0.075502878***
60	-0.00305	-0.0301**	0.200215	0.031523525**
70	-0.01896	-0.15615	0.188767	0.027707659**
80	-0.01549	-0.14478	0.150495	0.057434284**
90	-0.00022	-0.01204*	0.211129	0.077645718***
100	0.013505	0.112051	0.207678	0.076495281***
110	-0.00753	-0.08358***	0.165082	-0.02200614**
120	-0.00722	-0.07518***	0.125731	-0.026360557**
130	-0.00997	-0.10668***	0.13126	-0.024517348
140	-0.00316	-0.03254**	0.094552	-0.036753584**
150	-0.01368	-0.12545	0.106686	-0.032708924
175	-0.01093	-0.11349	0.104325	-0.024748196**

*1% significance level
**5% significance level
***10% significance level

Figure 2: Cumulative abnormal return throughout the time-line of cross listing

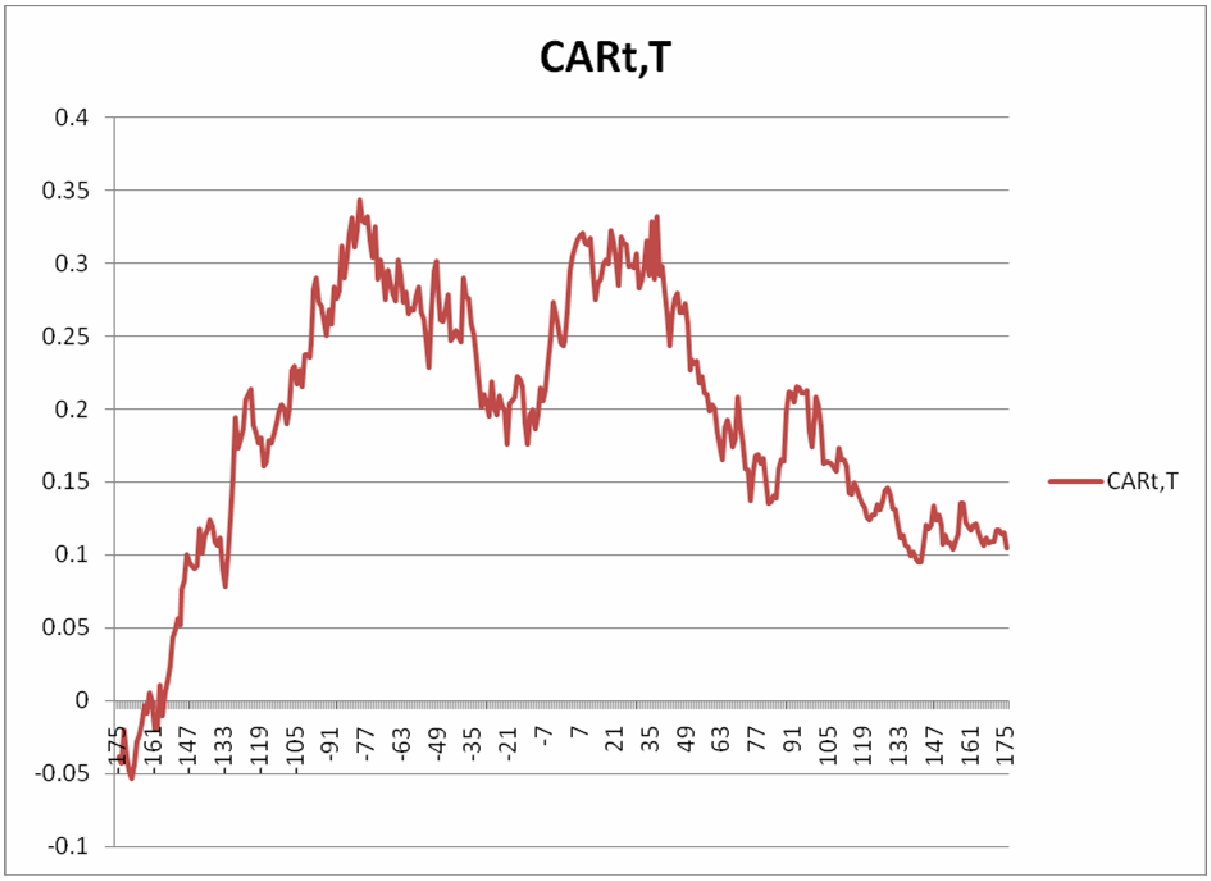


Figure 3: Average abnormal return throughout the time-line of cross listing

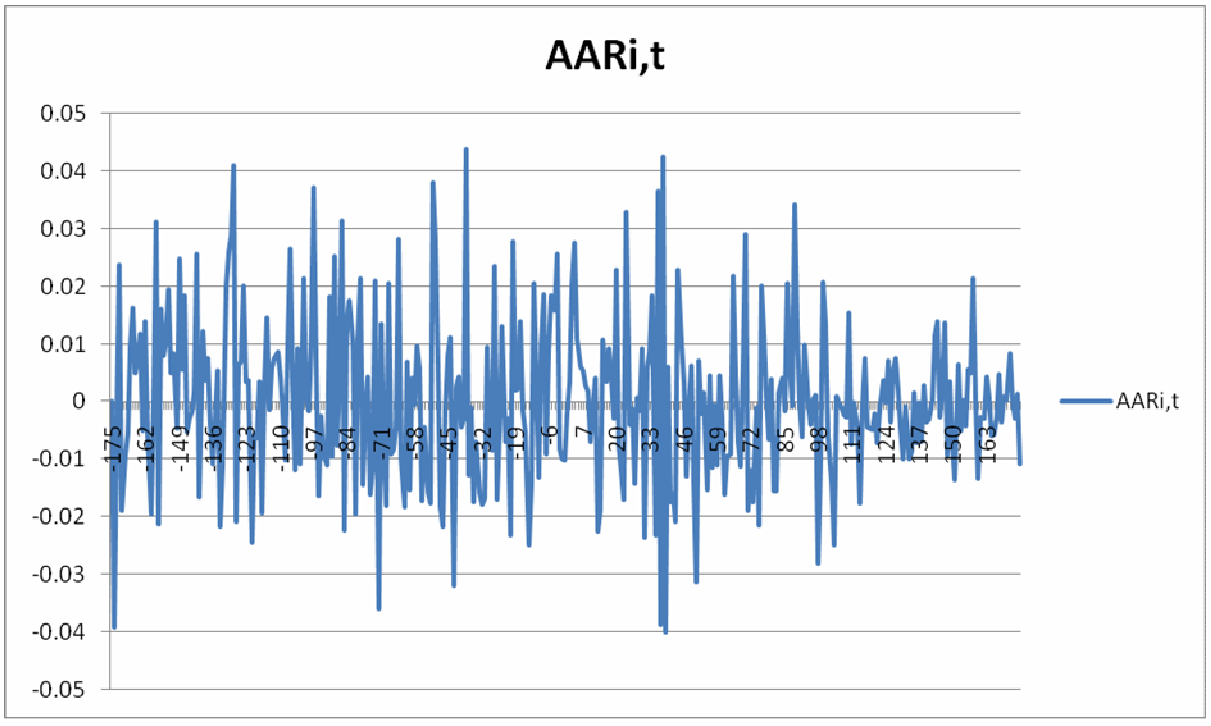


Table 3 presents the daily average abnormal returns (ARit), and the cumulative abnormal returns for Day –25 through Day +25 around the listing date. We also found a significant positive cumulative average abnormal return over the interval [–5, +5] days around the first trading day. The cross listing are typically associated with positive abnormal returns as 10 out of the 25 days before the event have positive mean abnormal returns and seven of them are statistically significant at 1%,5%,10%. On the listing day, Day 0, the local market exhibits negative statistically significant average abnormal return of 0.206% and pre-event day carries positive 1.58% return. The stock value show gradual decreases after the cross listing and listing effect starts to dissipate after the event day. Seventeen out of 25 days' abnormal returns are negative after the foreign cross listing and eight are statistically significant. The cumulative abnormal return is also presented in thetable-2. The CARS are almost positive and statistically significant at 1%, 5%, 10% level. So the study indicates that the listing premium behave very differently in the immediate days surrounding the events. This is also confirmed with earlier studies. From the above Figure 2, we can conclude that stock prices show increases cumulative abnormal return on the day of listing, i.e., Day 0 and finally it stabilizes after 100 days. This is in confirmation of the general trend of any stock when its issues an ADR. There is no specific trend visible from the Figure 3, i.e., Average abnormal return vs time-line of cross listing. One major point to note is that the scattered decreases during the time of issue of ADR and there is a negative average abnormal return around Day 0. This post-listing performance may also be linked to a reduction in the underlying sensitivity to the company's share price among domestic investors, which results in lower required returns. It is also believed that firms may have difficulty adjusting to their new environment, where disclosure requirements are usually higher than in their home market. Another possible explanation is that the firm may have issued too much equity at the time of listing relative to what the investors were willing to support (Karolyi 1998; Foerster and Karolyi 1999).

Conclusion

The present study investigates the impact of cross listing of ADR on the Indian stock market. Listing a company's stock abroad should have no impact on its price when domestic and foreign equity markets are fully integrated. If barriers exist, however, a firm's share value may be affected by the cross-listing announcement. Empirical evidence suggests that shares of cross-listed firms tend to experience abnormally high returns prior to their foreign listing and shortly thereafter. Our empirical evidence on the effects of international cross-listing on the underlying stocks concludes that there is significant negative return to the announcement of a cross listing. When considering variance of returns after the cross-listing, the results indicate decreased variance of returns for most companies in the sample. So it can be conclude that the ADR listing have no tangible financial benefits for the shareholders. These finding suggest that diversification into foreign equities provide returns similar to the market. Considering the additional risk associated with ADRs such as currency risk, the country's economy, asymmetric information problems and others, the performance may not provide adequate rates of return to satisfy some investors.

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