Does ADR Issue Influence Return and Volume of Underlying Domestic Stocks? -An Evidence from the ADR Issue Made by Wipro Ltd.

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Abstract

In the present era of globalization, increasing number of Indian companies are going for cross-border listing of their equity capital in the form of Depository Receipts (DRs). The main purpose of the study is to analyse the impact of issue of American Depository Receipts(ADRs) on the return and volume of transaction of underlying stock of the Wipro Ltd. To analyse the change in volatility after the issue of ADRs by the company, Generalized Autoregressive Conditional Heteroscedasticity(GARCH) model has been used. In the mean equation of GARCH, one lagged stock returns and BSE-Sensex return are used as independent variables. One day lagged stock return represents the impact of company specific news on the stock return and BSE-Sensex proxies Indian stock market. Wipro Ltd. has issued its ADRs on 27th October, 2000. Pre-period of the study is from 27th October,1997 to 26th October, 2000 (3 years) and post-period of the study is from 28th October, 2000 to 27th October, 2003 (3 years). Results of the study unfolds the fact that the cross-listing has significant positive impact on the volatility of underlying domestic stocks indicating that the ADR issue has been resulted in increase in volatility of the stock returns in India. It also points out that market risk rather than company specific risk factors are influencing volatility of stock returns of Wipro Ltd. Significant increase in volume of transactions in post-ADR regime indicates the increased confidence of investors in home country's stock market.

Keywords:

Cross-border listing, American Depository Receipts(ADRs), Volatility of stock prices, GARCH model and Paired sample t-test.

JEL classification: F30, F65,G15.

Introduction

One of the major initiatives as a part of financial reforms introduced in 1991, is to allow domestic companies to raise fund in the form of equity capital from abroad. The main motive, behind allowing Indian companies to raise equity capital from international markets, was acute crisis of foreign exchange reserves which was witnessed by Indian government in 1990's. After this crisis, which made the Indian government unable to meet its payments towards import requirements, the government has realized the importance of relaxing the norms on raising the funds by Indian companies from abroad and it has motivated many Indian companies to raise funds from abroad. Many Indian firms have raised funds from abroad in different forms like Global Depository Receipts (GDRs), American Depository Receipts(ADRs), External Commercial Borrowings(ECBs) and Foreign currency convertible bonds(FCCBs). Out of all these sources of external financing, Depository receipts were most commonly used sources of international financing in India.

Motives behind the increased popularity for external financing.

Foreign institutional investor(FII) give priority to Depository Receipts because of two important reasons i.e., (i) they need not get themselves registered with SEBI and (ii) presence of arbitrage opportunities, because it is common to see price difference between Depository Receipts(DR) price and underlying domestic stock price. Since 'Book Building' procedure can be adopted in public issue, cost of issue is very low and time taken for the issue will also be shorter. India, being one of the rapidly growing country, has huge potential for its companies to raise funds from abroad. Indian companies by their consistent growth and innovative strategic business practices like cross border mergers and acquisitions have created good image in the international markets which helped in raising funds in international market, even comparatively on large scale than from the domestic markets. Generally, the investors in international markets are institutional investors like hedge funds, venture capital funds, pension funds, mutual funds etc., and also these are well equipped with a strong professional team of fund managers. Hence, increase in the trading of Depository receipts will boost confidence in individual investors in home country as well as in international markets.

American Depository Receipts

American Depository Receipts(ADRs) are negotiable instruments which are issued by the US Depository Bank. These are denominated in US dollars. Any non-US company which is interested in issuing ADRs has to deposit its shares with a foreign custodian bank. An ADR may indicate a fraction of share, a single share or a multiple number of shares of the underlying stocks.

There are different types of ADR programs which provide different facilities subject to fulfilment of various conditions stipulated in the program. These programs can broadly be divided into two categories namely unsponsored ADR programs and sponsored ADR programs.

Unsponsored ADRs are those which are issued without the consent or participation of the company whose stock underlies the ADR. Such type of ADR are issued by depository bank where there is huge demand from the investors side. These are traded over-the-counter and holders of such ADRs do not have voting rights.

Sponsored ADRs are those which are created with the consent and participation of the issuing company. Sponsored ADRs are again divided into three level. In the case of level I ADRs, the ADRs are traded over the counter and the main advantage with such type of ADRs is these are subject to minimum compliance requirements with Securities Exchange Commission(SEC).

For Level II ADRs, the issuing company has to register itself with US Securities Exchange Commisson(SEC) and it has to follow US GAAP or IFRS. The main advantage with this type of ADRs is they can be listed on US stock exchanges. In the case of level III ADRs, issuing company has to follow the rules and regulations which are very similar to those followed by US Companies. The main advantage with Level III ADRs over Level II ADRs , is issuing company can raise capital directly in the US market.

The ADRs which are issued under SEC rule 144A are those which should raise the capital only through private placement in US market and only Qualified Institutional Buyers (QIB) are eligible to invest in such ADRs.

Brief Profile of Wipro Ltd.

Wipro Ltd was incorporated in the year 1945 by Azim Premji in Bangalore. Azim Premji was the promoter and chairman of the company. When it was incorporated in 1945, it was edible oil producer and then it was transformed into Fast Moving Consumer Goods (FMCG)industry and also started Information Technology services & Products business. Wipro Technologies has five business segments. They are (i) IT services, (ii) Product Engineering Solutions,(iii) Technology Infrastructure Sevices,(iv) Business Process Outsourcing, and (v) Consulting Services.

IT services business provides wide range of information technology services to the companies like CRM, ERP,SCM etc., Product engineering solutions business provides Research and Development Services in the world which enables firms to introduce new products in the rapidly changing world of information technology. Technology infrastructure Service business provides IT infrastructure services to the customer in many countries like US, Europe, Japan etc., Business Process Outsourcing unit provides services in the areas like Finance, Accounting , HR services etc., Consulting services unit provides services like Business consultancy, Process consultancy, Quality consultancy and Technology Consultancy. Other diversified business of Wipro includes Wipro Infrastructure Engineering which produces hydraulic cylinders and truck tipping systems. Wipro InfoTech manufactures computer Hardware. Wipro Lightings the manufacturer of luminaries and it also provides lighting solutions to various industries. In the year 1994-95, Wipro has got ISO 9001 certification for their five manufacturing and development facilities. In February 2001, it has got ISO:14001 for its Software business unit.

Rationale behind the selection of Wipro Ltd.

Wipro Ltd has issued ADRs in October, 2000 and it is the second company to issue ADRs in the software industry after Infosys technologies ltd. Wipro is the first Indian Information Technology service provider to be awarded Gold-Level Status in Microsoft's Windows Embedded Partner Program. It is the first IT services company to use 'Six Sigma' in the world. It is a Multinational company having its operations in many continents like North America, South America, Europe, Africa, Asia Pacific and Middle East. Wipro Ltd. is the constituent company of BSE-Sensex which is commonly considered as bench market index for Indian stock market. It is also the constituent of S&P CNX Nifty-50 Index which is also one of the representative index of Indian stock Market. Apart from this, Wipro Ltd. is constituent of many Indices like BSE-100 index, BSE-200 index, S&P CNX-100 index and S&P CNX-500 index. It is also the part of sectoral index of by Bombay Stock Exchange i.e., BSE-IT Index and sector index of National Stock Exchange i.e., S&P CNX IT Index. Based on market capitalisation on Bombay Stock Exchange(BSE), the company occupies around 13th Rank compared to other companies on the BSE. By giving due consideration to all these factors, ADRs issued by Wipro Ltd. have been selected for the present study.

Literature Review

Darius P. Miller(1999) examined the impact of international dual listing on underlying stock price movement. The study consists of

181 firms from 35 countries and period of study is from 1985 to 1995. The study has applied event study methodology to analyse the impact of announcement of firm's initial 'Depository Receipt(DR)' program on the share value. The study unfolds the fact that abnormal returns are largest for the firms which are listed on major stock exchanges like NYSE or NASDAQ and abnormal returns are smallest for the firms which are listed on minor stock exchanges. The firms which have chosen public offering for raising capital in US market, have experienced positive impact on their shareholders wealth, whereas the firms which have chosen private placements, have experienced negative impact on their shareholders wealth.

Rajesh Chakrabarti et al (2003) researched the effect of ADR issue on underlying domestic stocks and they also studied the relationship of these stocks with Indian market and US market. Stocks of ten companies which issued ADRs are selected for their study and in this study a regression equation has been developed to predict the returns of ADR prices in US market. Predictors included in the regression equation are stock prices, US-Dollar exchange rate, BSE-Sensex and two important US market indices i.e., S&P500 and NASDAQ. The study concludes that much of ADR trading is motivated by local factors in the US market and ADR prices exhibit so little predictability.

Athanasios et al (2006) examined symmetric information spillover effects from foreign equities to home equities. The analysis also takes into account the influence of different regulatory structures across the markets where the firms are listed. The results of the study reveals that volatility transmission depends on different levels of regulatory framework prevailing in the countries where the stocks are listed and symmetric information also play its key role in volatility spillovers between markets.

Dongcheol Kim et al(2007) analysed volatility spillover between local market and US market. They used 114 stocks of Asian, European and Oceanian underlying stocks and their ADRs. The study brings out the fact that day time returns on underlying stocks are more volatile than their overnight returns. However, in the case of ADRs, overnight returns are more volatile than day time returns. The study suggests that local day time information is more influencing in the local and US markets on the pricing of the stocks which have cross-border listing compared to US day time information. The study also concludes that the more the foreign operations, the more the degree of volatility spillover.

Athanasios Koulakiotis et al(2009) have examine the impact of issue of cross-border listing on volatility spillover between the foreign market and home market. The study has applied modified GARCH model to examine the impact of pre and post listing periods on the volatility spillover. The study discovers the presence of volatility spillover effect, but the level of spillover effect vary according to time of listing and the regulatory structure of the foreign stock market.

Mehmet et al(2010) examined variation in volatility of stocks from emerging markets that are listed on US exchanges. Sample of the study consists of first-time ADR listings of 14 emerging markets from 1990-2007. The study applied EGARCH model to analyse the changes in volatility of stocks after the issue of ADRs and the study conducted the tests in three regional groupings i.e., Asia, Latin America and Eastern Europe. Their study concludes that there is no statistically significant change in systematic risk after the issue of ADRs.

Yong-Chen Su et al (2011) studied causal relationship between ADRs issued by Taiwan companies and their underlying stocks. Results of the study identified unidirectional causal relationship from Nasdaq listed ADRs to underlying stocks and in the same way unidirectional causality was also observed between Nasdaq listed ADRs to Taiwan stock market. The study identified positive relationship between past returns of ADRs and current returns of underlying stocks. It was also observed in the study that the quality of information provided by the companies has been improved after cross-border listing because of legal restrictions and stringent norms on corporate governance etc.

Objectives of the study

The main purpose of the present study is to analyse the impact of cross-border listing by Wipro Ltd on the volatility of underlying domestic stocks and the study also examines the impact of cross-border listing on volume of transactions of underlying stocks.

Data and methodology of the study

The study period includes three years immediately preceding the date of issue of ADRs and three years immediately succeeding the date of issue of ADRs. Wipro Ltd. has issued its ADRs on 27th October, 2000. Pre-period of the study is from 27th October,1997 to 26th October, 2000 and post-period of the study is from 28th October, 2000 to 27th October, 2003.

Computation of Natural Logarithmic returns

Natural logarithmic values of returns are computed for company's stock prices and for BSE-Sensex prices by applying the following formula

$$R_t = LN\left(\frac{P_t}{P_{t-1}}\right) \text{----------(1)}$$

In equation 1 , P_t is company's stock price or Sensex price at time 't' and P_{t-1} is company' stock price or Sensex price at time 't-1'. It is the common practice to use Natural logarithmic values for economic variables, because distribution of log values likely to be normal and log returns will capture the compounding effect.

Identification of Outliers in the Returns

After computation of Natural logarithmic returns, outliers present in the returns are identified and they are excluded from the data. Because, presence of outliers in the data will lead to misleading results and hence due care is given for identifying the outliers and excluding them from the data. In the stock market, there is greater possibility of extreme values in the distribution of stock returns due to corporate actions like stock splits, bonus issues, divided declaration etc., Market indices may also show extreme up and down because of sudden changes in macro economic environment, like change in government policy, sudden withdrawal of FII's on large scale, bankruptcy of big financial institutions etc.,

Descriptive Statistics

Natural logarithmic values of stock returns are computed for pre-

period, post-period and for whole period. Descriptive statistics for the returns are computed to study the characteristics of stock returns and market returns in pre- period, post-period and also in the whole study period. Descriptive statistics computed includes Mean, Median, Maximum, Minimum, Standard deviation, Skewness and kurtosis.

Testing the Stationarity of the data

Many econometric techniques require that the time series data should be stationary and if not, the regression results will be spurious. Non- stationarity is one of the common features of stock prices. Hence, natural logarithmic values of stock returns are used as inputs for the study, because it is generally assumed that natural logarithmic values will have normal distribution and they are mean reverting. In addition, stationarity of the data series is tested by applying augmented version of Dickey Fuller test. In the present study, Schwarz Information criterion with a maximum lag length of 23 is used to determine the optimum lag length for Augmented Dickey Fuller (ADF) test.

Generalized Autoregressive Conditional Heteroscedasticity (GARCH) Model

After testing the stationarity of the stock returns, impact of ADR issue on the volatility of underlying domestic stock returns is studied by employing Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model which is developed by Engle(1982) and originally proposed by Bellerslev(1986). GARCH model is applied to analyse the volatility of underlying domestic stock returns in pre-ADR period, post-ADR period and also in whole period of the study.

(a) Mean equation(in Pre, Post &Whole Period):

$$R_t = \alpha_0 + \alpha_1 R_{t-1} + \alpha_2 M_t + \varepsilon_t \quad \text{----------(2)}$$

(b) Variance equation(in Pre & Post Period):

$$h_t = \gamma_0 + \gamma_1 \varepsilon^2_{t-1} + \gamma_2 h_{t-1} \quad \text{----------(3)}$$

(c) Variance equation(in whole Period):

$$h_t = \gamma_0 + \gamma_1 \varepsilon^2_{t-1} + \gamma_2 h_{t-1} + D_1 \quad \text{----------(4)}$$

In mean equation, one day lagged returns from the company's stock price (R_{t-1}) and current day market returns (M_t) are used as independent variables. The purpose of using $R_{t-1}$is to analyse the company specific news impact on the stock price volatility and M_t is the market price for which BSE-Sensex is used as bench market index for Indian stock market. The logic behind the introduction of $M_t$into mean equation is to analyse the impact of domestic stock market conditions on the stock price volatility.

In whole period, to assess the impact of ADR issue on underlying stock price volatility, a dummy variable (D_1) has been introduced into the variance equation. The dummy variable will be given value '1' in post-ADR regime and value '0' in pre-ADR regime.

Results of Analysis

Descriptive statistics of Returns

To understand the characteristics of the stock returns and market returns in pre-period, post-period and in whole-period, descriptive statistics have been computed. Descriptive statistics computed in this study includes mean, median, maximum, minimum, standard deviation, skewness and kurtosis.

Table 1: Descriptive Statistics

Descriptive Statistics	Pre-Period		Post-Period		Whole-Period	
	Wipro Returns	Sensex Returns	Wipro Returns	Sensex Returns	Wipro Returns	Sensex Returns
Mean	0.342123	-0.011178	-0.034784	0.066881	0.170320	0.023949
Median	0.000000	0.032501	-0.118655	0.100829	0.000000	0.086423
Maximum	11.33193	5.495752	12.61339	4.445860	12.61339	5.495752
Minimum	-15.94519	-5.984522	-15.28541	-6.027435	-15.94519	-6.027435
Std. Dev.	4.176790	1.832746	3.697406	1.279168	3.966292	1.602881
Skewness	-0.031504	-0.117343	-0.326526	-0.346949	-0.124154	-0.198800
Kurtosis	3.371176	3.227535	5.361231	5.172682	4.126899	3.947605
Observations	726	726	612	612	1339	1339

Table 1 presents descriptive statistics of returns from Wipro ltd's stock and returns of the market. In pre-period, mean of stock return is positive and market return is negative, whereas in post-period, stock return is negative and market return is positive. In whole period, both the stock return and market return are positive. In pre-period, standard deviation of stock return is more than that of market return indicating that the volatility of the company's stock is more than that of market and the same situation can be observed in post-period and in whole period also. Skewness of the distribution is negative in all the three periods for both the stock returns and market returns. However, higher value of negative skewness in post-ADR regime indicates comparatively more number of large values in the distribution which indicates that the market for Wipro stocks is more speculative in post-ADR regime. Kurtosis of the distribution is leptokurtic in all the three periods.

Testing the Stationarity of Returns

Stationary of the time series data is pre-condition for applying Generalized autoregressive conditional heteroscedasticity (GARCH) model.

Hence, stationarity of the stock returns and market returns in pre-period, post-period and in whole-period has been tested by applying Augmented Dickey Fuller (ADF) test.

Table 2: Augmented Dickey Fuller Test

Variable		Pre-Period		Post-Period		Whole-Period	
		t-statistic	'p' value	t-statistic	'p' value	t-statistic	'p' value
Wipro Ltd.	Stock Return	-14.08824	0.0001	-24.44350	0.0001	-21.33524	0.0001
	Sensex Return	-25.32370	0.0001	-22.72052	0.0001	-34.17411	0.0001

Table 2 presents Augmented Dickey Fuller test which tests the null hypothesis that data series is non-stationary or it has a unit root in the distribution. The results of the test reveals that the stock returns and market returns during the relevant period are stationary ($P<0.01$). The Stationarity of the variables is proved in all the periods i.e., in pre-ADR period, in post-ADR period and also in whole period.

Impact of ADR issue on underlying domestic stock return & risk

In this section, impact of ADR issue on underlying domestic stock return and risk is studied by applying Generalized autoregressive conditional heteroscedasticity(GARCH) model. For every selected company, analysis of volatility is made for pre-period, post-period and for the whole period.

Table 3: Impact of ADR issue on Domestic stock returns of Wipro Ltd.

Period	Equation	Variable	Symbol	Coefficient	Std. Error	z-Statistic
Pre-Period	Mean Equation	Constant	α_0	0.184481	0.121245	1.521559
		stock return (-1)	$R_{t-1\,pre}$	0.182080	0.033771	5.391687
		Sensex return	$M_{t\ pre}$	0.860220	0.062096	13.85303
	Variance Equation	Constant	γ_0	0.293335	0.102604	2.858900
		ARCH	$\varepsilon^2_{t-1\,pre}$	0.092756	0.020363	4.555128
		GARCH(-1)	$h_{t-1\,pre}$	0.885543	0.020921	42.32864
Post Period	Mean Equation	Constant	α_0	-0.108116	0.102895	-1.050745
		stock return(-1)	$R_{t-1\,post}$	-0.052347	0.031067	-1.684951
		Sensex return	$M_{t\ post}$	1.418428	0.074693	18.99000
	Variance Equation	Constant	γ_0	0.276285	0.090843	3.041344
		ARCH	$\varepsilon^2_{t-1\,post}$	0.080694	0.016341	4.938154
		GARCH(-1)	$h_{t-1\,post}$	0.889514	0.022404	39.70392
Whole Period	Mean Equation	Constant	α_0	0.050764	0.078061	0.650316
		stock return(-1)	$R_{t-1\,whole}$	0.071878	0.023488	3.060217
		Sensex return	M_{twhole}	1.049680	0.049779	21.08674
	Variance Equation	Constant	γ_0	0.375676	0.092007	4.083106
		ARCH	$\varepsilon^2_{t-1\,whole}$	0.094720	0.013364	7.087867
		GARCH(-1)	$h_{t-1\,whole}$	0.875801	0.015114	57.94473
		Dummy Variable	D_1	-0.058386	0.060814	-0.960075
Z-test Critical values – 1% level :2.58, 5% level : 1.96, 10% level: 1.645						

Table 3, shows the impact of ADR issue by Wipro Ltd. on its stock returns in India. In mean equation, R_{t-1} represents one day lagged value of stock return, M_t denotes return from BSE-Sensex index which is proxied as bench mark index for Indian stock market. In variance equation, constant indicates unconditional variance, ε^2_{t-1} is one day lagged value of squared error term which implies the impact of recent news on the conditional volatility and h_{t-1} is one day lagged value of variance which denotes the impact of old news on conditional volatility. In whole period, in variance equation, D_1 is the dummy variable indicating the impact of introduction of ADR on underlying stock price volatility.

In pre-ADR period, coefficient of constant is positive but not significant($Z_{cal}<Z_{tab0.01}$), whereas one day lagged stock return and Sensex return are positive and significant ($Z_{cal}>Z_{tab0.01}$) indicating their positive influence on stock return. In variance equation, coefficients of constant, ARCH and GARCH are positive and significant at 1% level of significance($Z_{cal}>Z_{tab0.01}$). It clearly indicates that volatility of stock returns is influenced by recent news as well as old news in the market. It also points out that unconditional variance has significant influence on volatility of stock returns. When compared to coefficient of GARCH, coefficient of ARCH is very low, it implies that movement of stock price very random. Sum of coefficients of ARCH and GARCH is very closer to one pointing out the strong persistence of volatility of stock returns.

In post-ADR period, in mean equation, coefficient of constant and one day lagged stock return are negative, but not significant ($Z_{cal}<Z_{tab0.01}$), whereas coefficient of Sensex returns is positive and significant($Z_{cal}>Z_{tab0.01}$). It clearly points out that it is the market return rather than past returns of company which can influence the returns from companies stocks. In variance equation, coefficient of constant, ARCH and GARCH are positive and significant at 1% level of significance ($Z_{cal}>Z_{tab0.01}$). It signals that the volatility in the market is sensitive to recent news and old news. Sum of coefficients of ARCH and GARCH is closer to one which implies that the volatility is persistent during this period and slow mean reversion of the returns.

Coefficient of ARCH is 0.0928 in pre-period and it is decreased to 0.0807 indicating the nominal decrease of recent news impact on volatility of stock returns. Coefficient of GARCH is 0.8855 in pre-period and it is increased nominally to 0.8895 in post-period. In both the periods, weightage of GARCH is comparatively very high in the variance equation. It clearly indicates the exponential nature of volatility of company's stocks and poor predictability of stock returns. Sum of coefficients of ARCH and GARCH is 0.9783 in pre-period and it is 0.9702 in post-period indicating almost no change in persistence of volatility in post-ADR regime.

In whole period, coefficient of constant is positive, but not significant ($Z_{cal}<Z_{tab0.01}$), whereas coefficients of one day lagged stock return and Sensex returns are showing significant positive impact on stock returns ($Z_{cal}>Z_{tab0.01}$). In variance equation, coefficients of constant, ARCH and GARCH are exhibiting positive significant impact on the variance of stock returns($Z_{cal}>Z_{tab0.01}$). Comparatively very high weightage of GARCH indicates that old news is exhibiting greater impact than the recent news on the volatility of stock returns. It means that the movement of stock prices is very random. Dummy variable, which is used to analyse the impact of ADR issue on the stock price in India, is negative indicating decrease in volatility in post-ADR regime, but it is not significant ($Z_{cal}<Z_{tab0.01}$).

Impact of ADR issue on Volume of Transactions of underlying domestic stock

Adjustment of stock split

As the stock split of Wipro ltd stocks has been done by the company in the ratio of 1:5 on 27th September,1999, all the volume of transactions from the day of stock split are divided by 5 to nullify the effect of stock split on the volume of transaction in calculating paired sample t-test. Descriptive statistics are also computed after making the above adjustment, so that comparison of descriptive statistics can be made properly.

Table 4: Descriptive Statistics of Daily-wise Volume of Transactions

Period	Mean	Std. Deviation	Coefficient of Variation	Skewness	Kurtosis	N
Before Stock Split Adjustment						
Pre-Period	1,08,895	2,21,656	204%	2.517	6.103	785
Post-Period	4,31,944	3,57,353	83%	1.337	2.120	815
After Stock split adjustment						
Pre-Period	25,066	43,532	174%	2.462	6.005	785
Post- Period	86,388	71,470	83%	1.337	2.120	815

Table 4 presents descriptive statistics on the volume of transactions of Wipro ltd in pre-period and in post-period before stock split adjustment and also after the stock split adjustment. Before stock split adjustment, in pre-period, mean volume of transactions were 1,08,895 with a standard deviation of 2,21,656 whereas in post-period, mean volume of transactions were 4,31,944 with a standard deviation of 3,57,353. In Pre-period, coefficient of variation is 204%, but after stock split adjustment, it is decreased to 174%. It is clear from the analysis that deviation in volume of transactions is mainly due to stock split which took place in pre-period. Skewness of the distribution is positive in both the pre-period and post-period indicating large number of low values in the distribution of data of volume of transactions. Kurtosis of the distribution is leptokurtic in pre-period, whereas in post-period, it is platykurtic. It implies that compared to pre-period, in post-period, there are more erratic swings in the distribution of data which unfolds the fact that values in the distribution are not closer to their mean value.

Table 5: Results of Paired Sample T -test

Null Hypothesis	t-test statistic	Degree of freedom	'p' value (2-tailed)
There is no significant difference between the Volume of transactions in pre -period and in post-period.	-18.778	784	0.001

Paired sample t-test has been conducted on the volume of transactions between pre-ADR regime and post-ADR regime to test the significant difference between volume of transaction in both the periods. T-test statistic value is -18.778 with a 'p' value of 0.001 indicating that the null hypothesis is rejected at 1% level of significance stating that there is significant difference between the volume of transactions in both the period. Descriptive statistics points out that there is very much increase in volume of transactions in post-ADR regime. It is interested to know whether the increase in volume of transactions is statistically significant or not. Hence, one tail test is done just by dividing the 'p' value by 2. 'p' value of one tail test is 0.0005 which can obviously be significant at 1% level of significance indicating that increase in volume of transactions in post-ADR regime is significant statistically.

Findings

In the present study, a modest attempt has been made to analyse the impact of cross-border listing of stocks by Wipro Ltd on its stock prices in India. Results of the study reveals that ADR issue has been resulted in decrease in volatility of underlying stocks, but the decrease in volatility is not significant. In all the three periods, coefficient of Sensex returns is showing significant positive impact on the company's returns. In mean equation, compared to coefficients of other variables, coefficient of Sensex returns has very high weightage. Though, the coefficient of one day lagged stock return which represents the impact of company specific news on stock returns, is significant in pre-period and in whole period, compared to coefficient of Sensex returns, its weight is very low. It clearly points out that it is the market conditions those are leading the company's stock returns rather than company specific information. Even after the introduction of ADRs, there is an increase in coefficient of Sensex returns which signals that the company's domestic stock returns are not much influenced by the cross-border listing. It supports the theory of 'market segmentation'.

Significant Increase in volume of transactions in post-ADR regime indicates that there is increase in investors confidence in the home country's stock market. after the issue of ADRs by the company. Hence, it can be inferred that cross-border listing has its significant influence only on the volume of transactions, but not on the returns of the underlying domestic stocks. Cross-listing by the company will provide many positive benefits to the company like good image for the company in international stock market, increased marketing opportunities for companies products in world markets, raising funds cheaply in domestic as well as in international markets etc.,

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