

**PREMIA IN THE INDIAN ADR MARKET**  
**An Analysis of Trends and Causes**

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April 3, 2006

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# I INTRODUCTION

Indian Companies' ADRs/GDRs Premiums, Discounts for July 5  
2005-07-04 18:30 (New York)

July 5 (Bloomberg) -- The following table of American and global depository receipts of Indian companies compares their closing prices with the most recent closes in local trading. Price adjustments are based on a currency value of 43.55 rupee per dollar, along with the number of shares per ADR or GDR.

Company	ADR/GDR Ticker	Close	% Chg	Local Equiv.	Local Close	ADR/GDR % Prem	Shares/ ADR/GDR
Dr Reddy's	RDY	17.10	+1.06	744.62	775.90	-4.03	1.0
HDFC Bank	HDB	47.89	+2.97	695.12	631.70	+10.04	3.0
ICICI Bank	IBN	22.00	+0.69	479.00	429.15	+11.61	2.0
Infosys Technologies	INFY	76.47	-1.46	3,329.89	2,394.85	+39.04	1.0
MTNL	MTE	6.58	+3.95	143.26	121.85	+17.57	2.0
Ranbaxy Labs	RBXD	24.70	-0.04	1,075.56	1,078.40	-0.26	1.0
Reliance Industries	RIGD	29.53	+1.48	642.94	643.85	-0.14	2.0
Satyam Computers	SAY	26.40	+1.54	574.79	511.00	+12.48	2.0
State Bank of India	SBID	41.75	+0.60	909.00	710.60	+27.92	2.0
Tata Motors	TTM	9.70	+0.21	422.39	426.75	-1.02	1.0
Wipro	WIT	20.58	-1.34	896.16	744.00	+20.45	1.0

Companies are listed based on a market capitalization of more than \$1 billion, average daily trading of at least 1,000 ADRs or GDRs during the last three months, and a history of trading at least four days a week.

--New Delhi newsroom, 91-11-5179-2020

11 Indian companies have their ADRs listed on the stock exchanges in the US.

The above article provides a list of the companies with ADRs listed in US, along with data regarding ADR prices in US, the underlying equity share prices in the Indian stock markets and the premium at which these ADRs are trading in the US stock markets vis-à-vis price of the underlying equity in Indian stock market.

**Exhibit I a**

<b>Company</b>	<b>Listing in US stock Markets</b>
Infosys Technologies	Mar-99
Wipro	Oct-00
ICICI Bank	Mar-00
Satyam Computers	May-01
HDFC Bank	Jul-01
MTNL	Jan-98

We observe that in case of Infosys, Wipro, State Bank of India and MTNL the premium is substantial ( $> 15\%$ ) while in the case ICICI Bank, HDFC Bank and Satyam Computers, the ADR premium is a material figure. What is pertinent is the fact that these premiums are not a one time aberration but have been in existence for a long time (in case of Infosys, the premium of  $>30\%$  can be traced back to its listing in the US in March 1999). Most of the ADRs have been listed in the US for some time but continue to trade at premiums. Exhibit I a indicates when some of the Indian companies were listed in the US.

If we accept the notion of efficiency of stock markets (no matter to what degree), it seems improbable that such significant premiums can be allowed to exist for long by arbitrageurs. The very fact that this data is being reported daily on Bloomberg means that the ADR premiums are public knowledge.

**Exhibit I b**

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<b>Economy</b>	<b># of stocks</b>	<b>Date</b>	<b>Average ADR premium</b>	<b>Maximum</b>	<b>Minimum</b>
India	11	5-Jul-05	12.15%	39.04%	-4.03%
Germany	18	5-Jul-05	0.26%	0.96%	-1.58%
China (listed Hong Kong)*	15	5-Jul-05	0.15%	2.44%	-1.76%
South Korea	11	6-Jul-05	1.32%	6.22%	-1.41%
Hong Kong	17	4-Jul-05	-0.14%	2.22%	-2.59%
Taiwan	13	4-Jul-05	1.95%	12.51%	-2.70%
Singapore	4	5-Jul-05	-0.14%	1.35%	-1.77%
Australia	19	4-Jul-05	0.41%	3.12%	-1.35%
UK	48	5-Jul-05	1.23%	4.48%	-5.35%

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\*excludes Yanzhou Coal, a significant outlier

To check whether this phenomenon is peculiar to Indian ADRs only, we analyzed the premiums at which ADRs of other countries trade in the US. We included ADRs from Germany, South Korea, China (shares listed in Hong Kong), Taiwan, Hong Kong, Singapore, Australia and UK in our sample. The results are presented in Exhibit I b.

We observe that Indian ADRs not only trade at a relatively higher premium compared to other ADRs, but also at a significant premium in absolute terms. The highest ADR premium for India is 39% (Infosys). In fact, apart from Taiwan, ADRs of countries other than India trade at negligible premiums. This makes the phenomenon of Indian ADR premiums remarkable.

The phenomenon of existence of ADR premiums can be compared to at least 3 other cases in contemporary finance, viz.

- *Royal Dutch/ Shell group conundrum* – Royal Dutch Shell group was a joint venture between Royal Dutch Petroleum Company (RDP) of the Netherlands and the Shell Transport and Trading Company plc (STT) of UK in the ratio of 60:40. Even though RDP and STT had rights to cash flows of Royal Dutch Shell in 60:40 ratio (and no other assets), their share prices were never in 60:40 ratio i.e. cash flows with similar risk-return characteristics were valued differently by same set of investors.
- *The closed end mutual fund puzzle* – Closed end funds trade at a discount to their NAVs. This is a puzzle since prima facie there is no reason why the market price for a closed-end fund is usually different from the current value of the portfolio held by the fund, or its net asset value (NAV). In this regard, we would take a look at the closed end India Fund (IFN), its price versus NAV in Section IV (Investigating ADR premiums).<sup>1</sup>
- *3Com/Palm case* – In September 1999, 3Com announced its intentions to carve out Palm Computing, and subsequently spin it off. When Palm started traded publicly in March 2000, the market cap of Palm was \$53.4 billion, much higher than 3Com’s \$28.5 billion value, even though 3Com still owned 94% of Palm and also other assets. Based on 3Com’s 94% ownership, 3Com’s stake in Palm was worth approximately \$50 billion, giving substantial negative value to 3Com’s other assets, an almost perfect violation of the law of one price.<sup>2</sup>

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1 “Asymmetric Information and the Closed-End Fund Puzzle” - Oh & Ross 1993  
 “Investor Sentiment and the Closed-End Fund Puzzle” – Lee, Shleifer & Thaler 1990

2 “The Valuation and Market Rationality of Internet Stock Prices” – Ofek & Richardson, 2001  
 “The Parent Company Puzzle – When is the whole less than one of its parts?” – Cornell & Liu, 2000

## Research Objectives

This research aims to analyze the continued existence of premiums on Indian ADRs over the last 3-4 years and investigate the reasons for the same. If any security, carrying the same risk-reward characteristics, trades at two different prices in different markets, the arbitrageurs will soon step in to take advantage of the situation, till the time the security trades at one price, across all markets. That has not happened in the case of these Indian ADRs.

The paper looks at the following possible sources of the premium:

1. *Legal / Institutional*: Laws regarding capital account transactions in India, including the rules and exact procedures for investment by foreign nationals in Indian securities market and repatriation of those funds. If the foreign nationals have limited or no access to Indian stock markets, it is probable that ADRs in the US markets are valued under different assumptions compared to the valuation of underlying equity in the Indian stock markets (which is, to an extent, same as saying that the two securities have two different bodies of investors, with different expectations and assumptions).
2. *Liquidity*: Measuring the relative liquidity of ADRs in the US to the underlying stock in India, which may be a partial cause of the premiums. In case the liquidity of

ADRs is higher, the ADRS would carry certain liquidity premium vis-à-vis equity listed on the Indian stock markets.

3. *Risk preferences:* The investors may assign different risk-reward characteristics to Indian equities and Indian ADRs on account of currency risk, repatriation risk or risk of procedural delays in security transactions in India. This may also result in a premium on ADRs.

The remainder of this paper is divided into three sections. Section II focuses on analyzing the ADR premiums, their trends and correlations with concerned stock markets and securities. Section III attempts to delineate the differences between institutional frameworks that govern capital account transactions in India and three vibrant economies in world markets – Germany, Hong Kong and South Korea. We attempt to analyze whether these differences may be causing ADR premiums. Section IV covers an investigation of the likely causes of ADR premiums.

Section V summarizes our findings and analyses.

## **II ANALYSIS OF ADR PREMIUMS OVER TIME**

This section divided into two parts. Part A is aimed at analyzing the trends in ADR premiums and the movement in ADR premium levels in recent years. Part B explores the relationship between returns on ADRs with the returns on the underlying equity, and with the returns on broad market indices (viz S&P 500 and the Bombay Sensex in India). The analyses in this section would help us put the issue of ADR premiums in perspective, against a backdrop of long terms trends in ADR premiums, and the relationship of ADRs with underlying equity and the US and Indian stock markets.

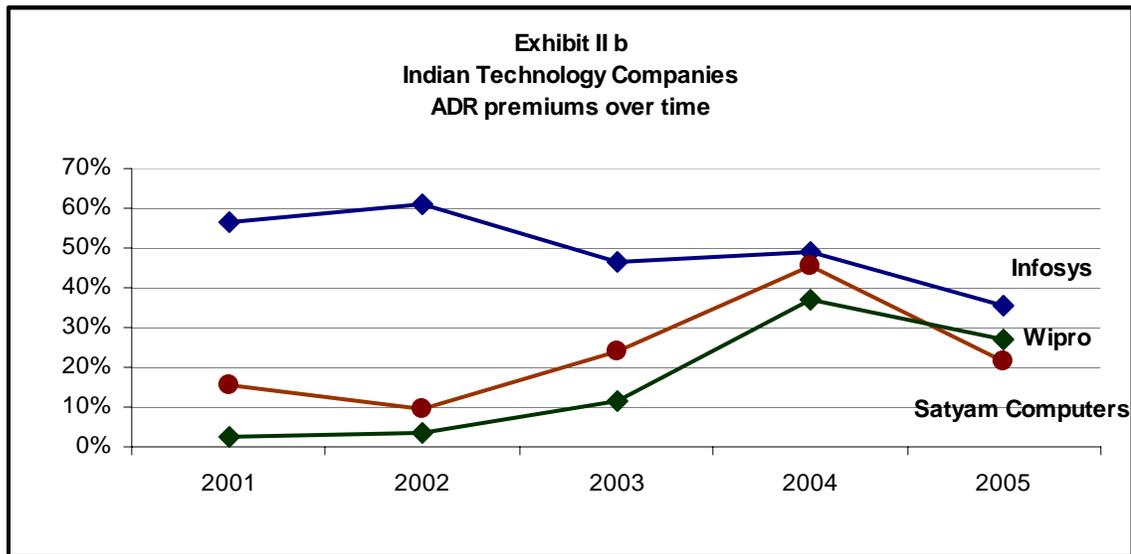
### **A. Trend Analysis of the ADR Premiums**

We have analyzed the ADR premiums trend over a period of last 5 years. The results are detailed in Exhibit II a.

Graphically, we present Exhibit II b - d, the ADRs with relatively the highest premiums over time among Indian ADRs.

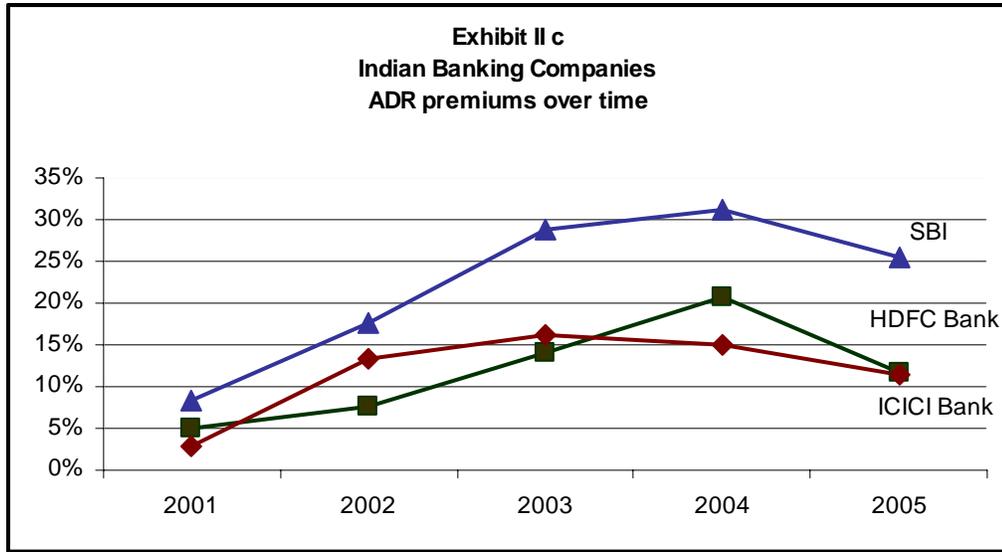
**Exhibit II a**

ADR Stock	Ticker	2001	2002	2003	2004	2005	Average
Dr Reddy's	RDY	7%	2%	1%	3%	2%	3%
HDFC Bank	HDB	5%	8%	14%	21%	12%	12%
ICICI Bank	IBN	3%	13%	16%	15%	11%	12%
Infosys	INFY	57%	61%	46%	49%	36%	50%
MTNL	MTE	5%	1%	1%	21%	15%	9%
Ranbaxy Lab.	RBXD	13%	8%	9%	2%	1%	7%
Reliance Industries	RIGD	38%	38%	37%	43%	31%	37%
Satyam Computers	SAY	15%	10%	24%	45%	21%	23%
SBI	SBID	8%	18%	29%	31%	26%	22%
Tata Motors	TTM	0	0	0	1%	0%	0%
Wipro	WIT	2%	3%	12%	37%	27%	16%
<b>Average</b>		<b>14%</b>	<b>15%</b>	<b>17%</b>	<b>24%</b>	<b>16%</b>	<b>17%</b>

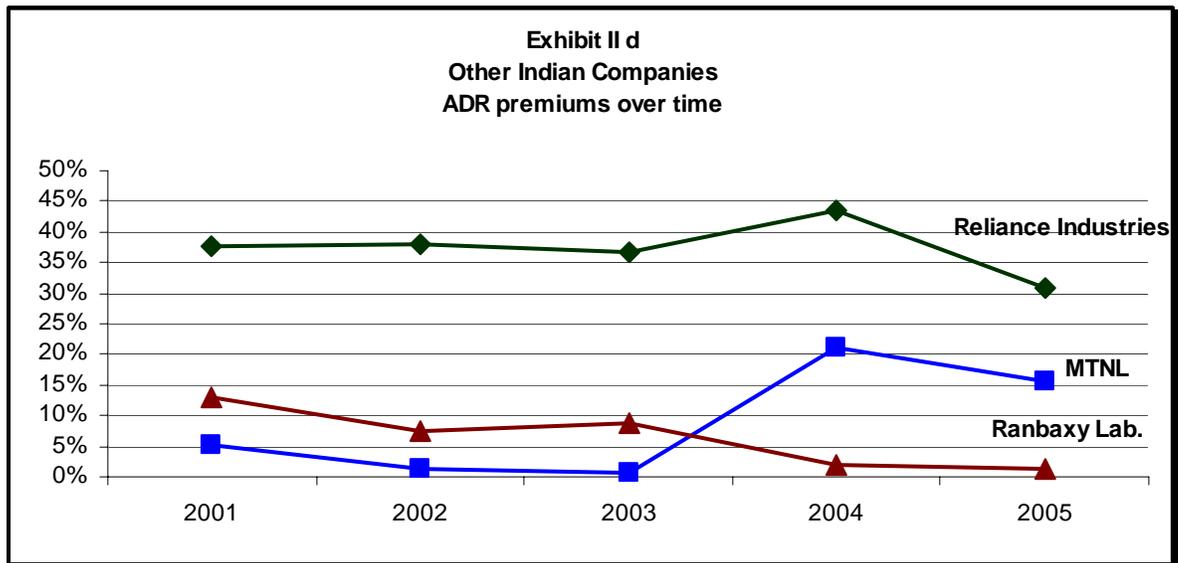


We observe that ADRs in information technology sectors have historically traded at premiums. We also observe that Infosys exhibits the highest premium among Indian ADRs (almost 60% in 2002), but the premium is trending down and is almost half of its 5 year high in 2005. In fact, currently the Infosys ADR premium is around 17%, which certainly is remarkable given the fact that it is a historic low. Wipro and Satyam Computers, in contrast, had low ADR premiums initially, peaked at 35%-45% in 2004

and trended down to over 20% in 2005. Currently, Wipro trades at 24% ADR premium while Satyam trades at 16% premium.



The banking sector of India has shown continued strength, and it is, therefore, no surprise that the bellwethers of Indian banking sector, State Bank of India (SBI), ICICI Bank and HDFC Bank, have shown continuous increase in ADR premiums till 2004. In 2005, however, premiums on all three ADRs has declined significantly. Currently, these banking sector ADRs trade at 13%-15% premiums.



Of the remaining ADRs, in our sample, Reliance Industries has maintained the most stable premium of 30-40% in last 5 years, but in 2006, the premium is down to <5%. While MTNL ADR premium declined to almost 0% by 2003, Ranbaxy's hovered around low teens and high single digits in 2001-03. In the last two years (i.e. 2004 & 2005) MTNL ADR premiums have shot up to over 15%, while Ranbaxy's declined precipitously to almost zero.<sup>1</sup> Two other ADRs in our sample, Dr Reddy's (Pharmaceuticals) and Tata Motors (Automobiles) have shown negligible premiums (<5%) for the period under study.

Across the board, however Indian ADRs have shown a decline in ADR premiums over the period 2001-2005. The simple average for 11 ADRs has declined from 2004 high of 24% to 16% in 2005 and was only 11% in February 2006.

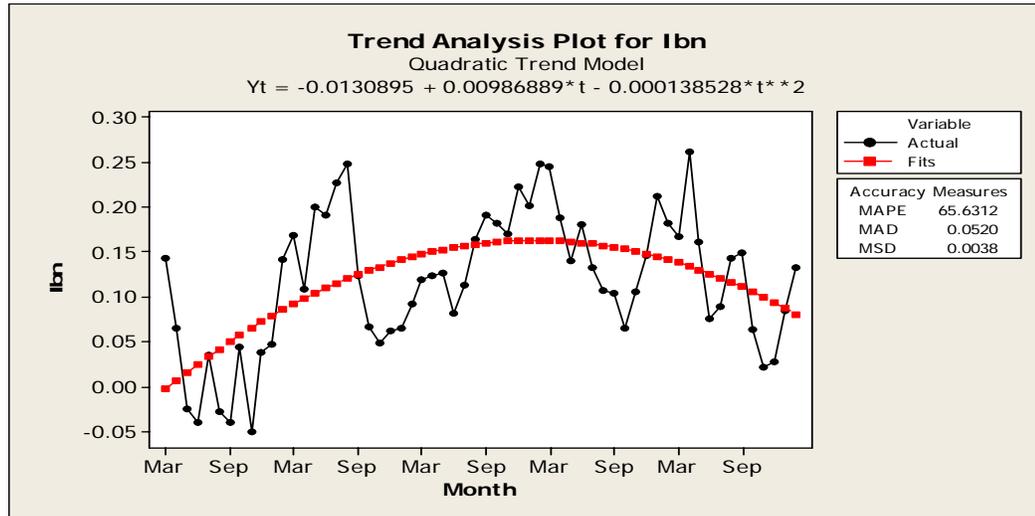
<sup>1</sup> MTNL and Ranbaxy recently had their GDRs converted to ADRs, so the data relates partly to GDRs and partly to ADRs. Reliance (RIGD) is a GDR.

A trend analysis of all 11 ADRs has been conducted. The results shown a clear downtrend in ADR premiums over time, which indicates that the cause of ADR premiums is somehow being removed, or corrected, if you will, over time.

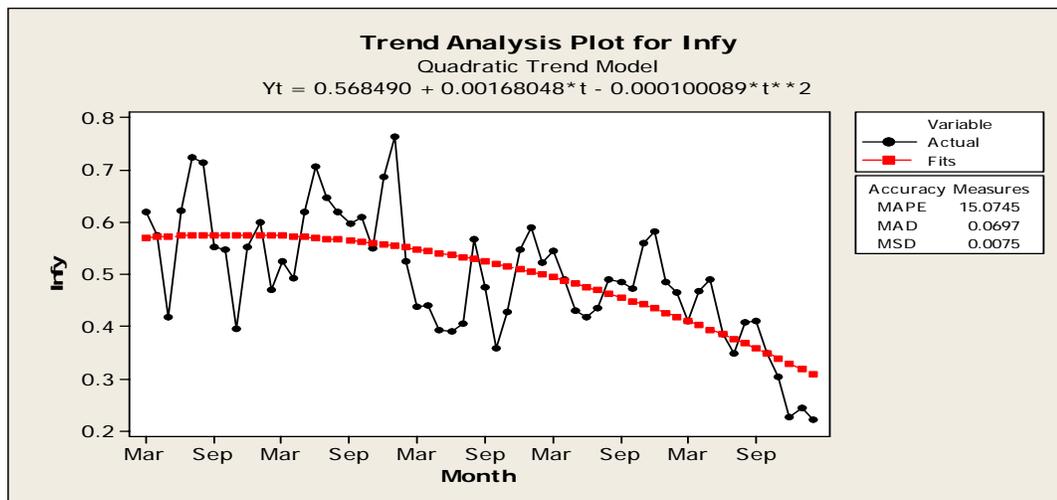
## Trend Analysis of ADR premiums over 2001-2005

*(Please refer to Appendix V for trend analysis of the entire sample of Indian ADRs)*

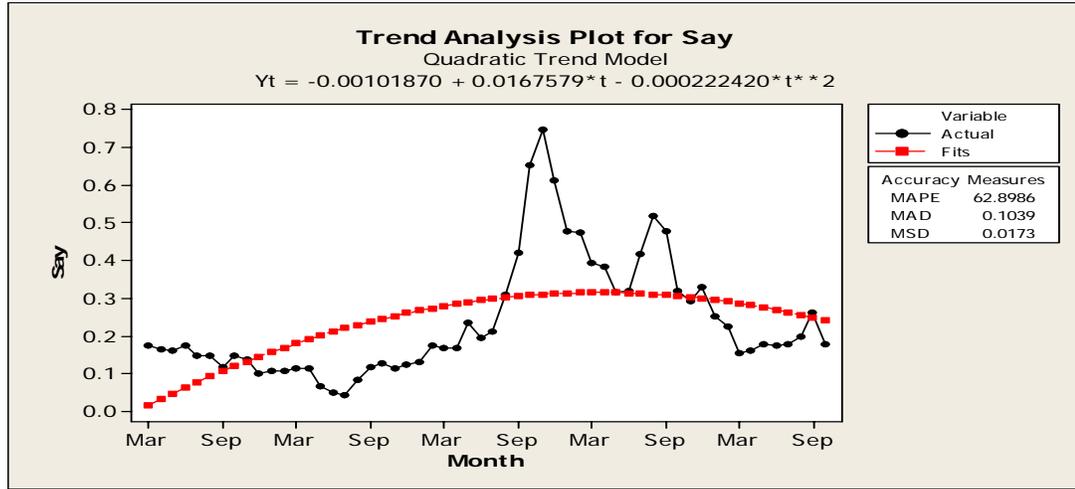
### ICICI Bank (IBN)



### Infosys Technologies (INFY)



Satyam Computers (SAY)



## **B. Risk – Return characteristics of ADRs**

Although the ADRs are a derivative of underlying equity, yet there exists a significant difference in the ADR prices compared to the price of underlying equity (i.e. the ADR premium). We look to understand the movements of ADR prices, vis-à-vis the underlying equity, the S&P 500 (where the ADRs trade), and the Indian stock market i.e. the Bombay Sensex (where the underlying equity trade). Towards this end, we conduct a correlation and regression analysis of ADR returns versus underlying equity returns, S&P 500 returns and Sensex returns. This would, to some extent, explain the *movements* in ADR premiums over time, by exhibiting the impact of US stock market movements, Indian stock market movements, and underlying equity price changes, on the ADR premiums. In this way, it would help us understand the relative sensitivity of ADRs to US stock markets versus the Indian stock markets, which may cause some divergence in prices of ADR and the underlying equity (i.e. the ADR premiums)

To gain further insight into price movements of ADRs and Indian equity (which would to an extent, explain the movement in ADR premium), we conducted simple regression analyses of ADR returns, separately with Indian equity returns (adjusted for currency movements and ADR:Equity ratios), with S&P 500 Index returns and with Bombay Sensex index returns. This analysis has been conducted specifically for the period June 2004 to December 2005, when we have seen considerably decline in the ADR premiums.

**Exhibit II e**

ADR Name	T-Statistic versus			R2 (Correlation) with			P-value			Higher Correlation with	Correlation of less than 30% with underlying
	S&P 500	Sensex	Underlying Equity	S&P 500	Sensex	Underlying Equity	S&P 500	Sensex	Underlying Equity		
Dr Reddy's	5.67	7.79	12.68	7.5%	13.6%	29.5%	0.00%	0.00%	0.00%	Sensex	Yes
HDFC Bank	5.54	7.2	8.39	7.1%	11.9%	15.5%	0.00%	0.00%	0.00%	Sensex	Yes
ICICI Bank	7.68	7.22	9.2	12.9%	11.9%	18.0%	0.00%	0.00%	0.00%	<b>S&amp;P 500</b>	<b>Yes</b>
Infosys Technologies	7.53	5.94	7.57	12.4%	8.4%	13.0%	0.00%	0.00%	0.00%	<b>S&amp;P 500</b>	<b>Yes</b>
MTNL	4.28	4.34	9.6	4.4%	4.7%	19.3%	0.00%	0.00%	0.00%	Sensex	Yes
Ranbaxy Labs	0.67	7.66	24.92	0.1%	13.2%	62.2%	50.40%	0.00%	0.00%	Sensex	No
Reliance Industries	2.03	15.81	29.62	1.0%	39.2%	69.9%	4.30%	0.00%	0.00%	Sensex	No
Satyam Computers	8.33	6.07	8.24	14.8%	8.7%	15.0%	0.00%	0.00%	0.00%	<b>S&amp;P 500</b>	<b>Yes</b>
State Bank of India	0.87	12.14	17.19	0.2%	27.6%	43.9%	38.70%	0.00%	0.00%	Sensex	No
Tata Motors	3.11	13.62	23.05	3.0%	38.0%	63.8%	0.20%	0.00%	0.00%	Sensex	No
Wipro	7.09	8.17	9.67	11.2%	14.8%	19.5%	0.00%	0.00%	0.00%	Sensex	Yes
Average	5.32	9.33	13.96	7.8%	19.3%	33.6%					
Bombay Sensex	1.21			0.4%			22.70%				

**Exhibit II e contd.**

<b>ADR Name</b>	<b>Beta versus</b>		
	S&P 500	Sensex	Underlying Equity
Dr Reddy's	0.67	0.59	0.48
HDFC Bank	0.81	0.67	0.44
ICICI Bank	1.16	0.72	0.45
Infosys Technologies	1.11	0.59	0.44
MTNL	0.74	0.49	0.46
Ranbaxy Labs	0.10	0.68	0.77
Reliance Industries	0.28	1.11	0.92
Satyam Computers	1.33	0.65	0.43
State Bank of India	0.12	0.95	0.62
Tata Motors	0.53	1.20	0.79
Wipro	1.10	0.82	0.49
Average	0.79	0.81	0.56
Bombay Sensex	0.10		

**Exhibit II f**

	Price as on		Change in S&P and ADR prices	Price as on		Adjusted for exchange rate		Change in Sensex and Indian Equity	Difference in Price change	ADR Premium		Δ ADR Premium
	28-May-04	31-Dec-05		28-May-04	31-Dec-05	28-May-04	31-Dec-05			28-May-04	31-Dec-05	
S&P 500	\$ 1,120.68	\$ 1,248.29	11%	Rs	Rs	45.465	45.195					
Sensex				4759.62	9397.93	104.69	207.94	99%	87%			
RDY	18.52	21.60	17%	887.55	978.50	19.52	21.65	11%	-6%	-5.1%	-0.2%	4.9%
HDB	28.32	50.90	80%	369.75	707.45	8.13	15.65	92%	12%	16.1%	8.4%	-7.7%
IBN	12.87	28.80	124%	246.35	584.70	5.42	12.94	139%	14%	18.8%	11.3%	-7.5%
INFY	41.38	80.86	95%	1,264.21	2,996.75	27.81	66.31	138%	42%	48.8%	21.9%	-26.8%
MTE	5.83	6.90	18%	111.70	144.20	2.46	3.19	30%	11%	18.6%	8.1%	-10.5%
RBXD	10.88	7.99	-27%	494.90	362.35	10.89	8.02	-26%	0%	-0.1%	-0.3%	-0.2%
RIGD	21.35	37.55	76%	331.57	684.34	7.29	15.14	108%	31%	46.4%	24.0%	-22.4%
SAY	19.54	36.59	87%	305.05	737.80	6.71	16.32	143%	55%	45.6%	12.1%	-33.5%
SBID	24.45	50.50	107%	484.85	907.45	10.66	20.08	88%	-19%	14.6%	25.8%	11.1%
TTM*	8.97	14.37	60%	403.35	653.00	8.87	14.45	63%	2%	1.1%	-0.5%	-1.7%
WIT	7.40	11.95	61%	250.75	463.45	5.52	10.25	86%	23%	34.2%	16.5%	-17.6%
<b>Average</b>			<b>64%</b>					<b>79%</b>	<b>15%</b>			<b>-10%</b>

\* prices as on Sep 30, 2004 and Dec 31, 2005 due to lack of prior trading data

The data in Exhibit II e indicates that the ADR prices do not move in lock-step with the prices of Indian equity. This is substantiated by the regression analysis that we have conducted on the ADR returns versus Bombay Sensex, S&P 500 and the underlying equity returns. We find that ADRs, on average, exhibit a lower beta with the underlying equity (0.56) vis-à-vis the Sensex or S&P 500 (0.80).

This is a surprising result. As mentioned earlier, the ADR is a derivative of the underlying equity, with exactly similar risk- return characteristics as the underlying equity. Given this fact, we would expect a beta near to 1 for ADR returns versus returns on the underlying equity. However, the average beta of ADRs with the underlying equity is only 0.56, (much lower than the average ADR beta of 0.81 for Sensex and average ADR beta of 0.79 for S&P 500). Thus, not only we have a difference in valuations of ADRs and underlying equity (the ADR premiums), but we also have changes in ADR premiums over time (as evidenced by lower sensitivity of ADRs to underlying equity price movements). Therefore a low beta should indicate an increase in ADR premiums during a bear run in the Indian stock market and a decline in ADR premiums when the Indian stock market is on a bull run (for e.g. from June 2004 onwards).

This observation is substantiated in Exhibit II f, which gives us details of price movement in ADRs and Indian Equity over the period, June 2004 – December 2005.

In general, we observe a decline in ADR premiums over this period. All ADRs (except RDY and SBID) have shown decline in ADR premiums and the average decline

is around 10%. At the same time the S&P 500 appreciated 11% vis-à-vis 99% appreciation in the Bombay Sensex (Indian Stock Market), a difference of 87%. However, ADR prices on an average increased only 64%, versus an average 79% increase in the prices of underlying equity shares – reflecting a beta of  $< 1$  with the underlying equity

It should be mentioned here that the correlation between the Bombay Sensex and S&P 500 is very low (0.4%) and the beta is quite insignificant (0.10). Given this data, it can be safely said that US stock markets and Indian stock markets are quite uncorrelated.

It is interesting to note that Satyam Computers, Infosys and ICICI Bank have higher correlations and betas with S&P 500 than with the Sensex, and a correlation of less than 30% (average 33.6%) with the underlying equity. Wipro also has a higher beta with S&P 500 than with the Sensex, and a correlation of less than 30% (average 33.6%) with the underlying equity. These stocks, thus, move more in tandem with US stock markets, than with Indian stock markets. Interestingly, average ADR premium for these stocks is 25%, much higher than the average ADR premium of 17%

Regression of ADR returns versus S&P 500 is significant in all cases, except MTNL, State Bank of India and Ranbaxy. The correlation of ADR returns with S&P500 is on an average 7.8% (quite low), but is relatively high for Infosys, Wipro, Satyam Computers and ICICI Bank. The regression of ADR returns with Bombay Sensex and the underlying equity is significant in all cases and the correlations of ADR returns with the

Bombay Sensex and the underlying equity are also higher than the S&P 500 (average 19.3% and 33.6%, respectively), which appears consistent with market facts (i.e. the ADR is a derivative of underlying Indian equity that trades in Indian stock market). At the same time, average ADR returns' correlation with underlying equity is higher than with Sensex – again a consistent result.

### **III ANALYSIS OF INSTITUTIONAL FRAMEWORK<sup>1</sup>**

In this section, we focus on laws regarding capital account transaction in India, including the rules and exact procedures for investment by foreign nationals in Indian securities market and repatriation of those funds. In order to understand whether these laws maybe the reason for ADR premiums, we have also investigated laws regarding capital account transactions in Hong Kong, Germany, and South Korea (whose ADRs do not carry any significant premiums at all – refer Section I)

Portfolio investment is relatively straightforward in India. Even retail investors can trade freely via a sub-account with any registered Foreign Institutional Investor (FII). We find that there are virtually no restrictions on portfolio investment in Germany, Hong Kong and South Korea, too. Repatriation of capital, profits and dividends is also free of any restrictions in India, Germany, Hong Kong and South Korea. As far as these factors are concerned, Indian capital markets have the same structure as developed capital markets (like Germany) and some vibrant emerging markets (like Hong Kong and South Korea).

Please refer Appendix I for details.

There is, however a crucial difference in ADR provisions of India and these countries. It is possible to convert ADRs into equity shares and conversely, equity shares into ADRs, without restrictions, in Germany, Hong Kong and South Korea. In India, the rules are different. The ADRs have only “limited two way fungibility”. What this implies

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<sup>1</sup> Source: Economist Intelligence Unit, The Economist

is that ADRs can be freely converted to equity shares, but equity shares in India can be converted to ADRs only to the extent of past conversion of ADRs in that company into shares. This is technically called “headroom”. If no ADR has been converted back into equity shares, it implies that no investor can buy shares in India and convert those shares into ADRs. The implication of ‘headroom’ provision is that if ADRs trade at a premium, it is not possible to conduct an arbitrage (i.e. short ADR and go long the Indian equity), because Indian equity cannot be converted into ADR (to close out the short sale), unless head room is available.

As mentioned above, ‘headroom’ is required in an ADR issue to allow arbitrage to happen. From my discussions with professionals in investment management, it appears that all the headroom has expired long time back and so conversion of local shares to ADR through this route is not possible right now. However, it is difficult to obtain the accurate and comprehensive information about “headroom” available for different ADRs, in terms of either current or historical data.

In the absence of “headroom”, it is difficult to convert Indian equity shares into ADRs (due to limited fungibility). Any arbitrage by way of short selling ADRs in US and buying the underlying security in India seems not possible. In that, the ADR provisions are certainly different from a developed market like Germany and emerging markets like Hong Kong and South Korea. It is realistically not possible to readily convert Indian equity shares into ADRs listed on the US equity markets, which makes it difficult for any investor to take advantage of ADR premiums.

Given the fact that “headroom” is not available, and ADR are trading at a premium, it implies that the higher ADR price is caused by the following factors:

1. Segmentation in the US and the Indian stock markets. This means that ADR and Indian equity are being valued differently by investors in these two separate markets.
2. Whether or not “headroom” is available, the existence of ADR premiums can be explained partially by (1) liquidity premium, (2) currency risk premium, and (3) cost for transactions / procedural hassles.

Section IV of the paper will investigate these questions.

## **IV INVESTIGATING ADR PREMIUMS**

As discussed in Section I, we now return to an investigation into the reasons that may be the cause of ADR premiums. The following issues will be investigated in detail to gain insights into the reasons causing the residual ADR premiums

### **Liquidity Premium**

Given the obvious ease of investing in ADRs, there is no doubt about their demand in the US, especially for an increasingly attractive success story like the Indian economy. If ADRs offer better liquidity than the underlying equity, it can be argued that the ADRs would be more attractive to investors who prefer liquidity.

It would be instructive to analyze the shareholding pattern of the ADRs and the underlying equity to investigate whether a relatively higher proportion of ADRs are owned by Institutional Investors (who prefer liquidity). Presuming ADRs are primarily held by Institutional Investors or broadly by investors who value liquidity (i.e. investors who trade a lot), the liquidity factor become important and may justify premiums on ADR prices.

There are several methods that have been used in the finance literature for gauging illiquidity which can be roughly divided into price-based measures (like the daily bid-ask spread divided by daily price) and volume-based measures (like daily trading

volume divided by shares outstanding). We have used a measure formulated by Amihud (2002) for gauging liquidity of ADRs and underlying equity. Amihud's measure calculates the average of daily ratio of absolute return to dollar trading volume.

$$\text{Specifically, Amihud's measure} = \frac{1}{D_t} \sum_{d=1}^{D_t} \frac{|R^{\text{adr } i, d}|}{\text{Vol}^{\text{adr } i, d}}$$

where  $D_t$  is the number of trading days in month  $t$ ,  $R^{\text{adr } i, d}$  is the daily return of ADR  $i$  on day  $d$  (within month  $t$ ), and the  $\text{Vol}^{\text{adr } i, d}$  is dollar trading volume of ADR  $i$  on day  $d$ , defined as number of shares traded times the ADR price on day  $d$ .

We use Amihud's (2002) liquidity measure for estimating the impact of liquidity on ADR premia. We calculated the daily Amihud measure for both the ADR and the underlying equity in Indian markets for the period from January 2001 to December 2005. The daily Amihud measure differential is then calculated in % terms in the following way;  $[\text{Daily Amihud Measure (ADR)}/\text{Daily Amihud Measure (Indian equity)} - 1]$ . This Daily Amihud Measure differential has then been used to derive monthly averages for each ADR from January 2001 to December 2005. Similarly we have calculated the daily premium at which ADRs trade in US markets (using the daily INR – USD exchange rate). This daily premium (in %) is then used to derive monthly average for each ADR over the period January 2001 to December 2005.

Exhibit IV illustrates the higher relative liquidity in 2004 for a sample of 4 ADRs, all of which have displayed high ADR premiums over a long period of time.

**Exhibit IV a**

ADR	Average monthly Amihud measure (ADR) / Average monthly Amihud measure (Underlying equity)
ICICI Bank	2.89
Infosys	2.29
Wipro	9.83
Reliance Industries	112.29

This indicates that ADRs in the US markets display a higher liquidity relative to the underlying equity in the Indian markets. As mentioned above, liquidity carries a premium and ADRs may be valued more by investors who prefer liquidity. Given this, we explore to what extent does liquidity play a part in the existence of ADR premiums.

We have, therefore, related the Monthly Amihud measure differential (an estimate of liquidity) to the premiums at which ADRs trade in the US markets.

Therefore, we have derived a regression equation for the data for all ADRs (11 in number) by a bunching together the monthly Amihud measure differentials and monthly ADR premiums. The results are presented below

**Regression Analysis: ADR premium versus AM differential**

The regression equation is

$$\text{ADR pre} = 0.186 + 0.000097 \text{ AM differential}$$

Predictor	Coef	SE Coef	T	P
Constant	0.185659	0.007771	23.89	0.000
AM differential	0.00009670	0.00006186	1.56	0.119

S = 0.175124    R-Sq = 0.4%    R-Sq(adj) = 0.2%

#### Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	0.07494	0.07494	2.44	0.119
Residual Error	578	17.72641	0.03067		
Total	579	17.80135			

We observe that the T- value is only 1.56 and the P-value is high at 11.9%. Also the R-sq is only 0.4%. Although it is well proven that liquidity commands a premium, in case of Indian ADRs it appears that the impact of liquidity difference between the ADRs and underlying equity is not a good predictor for the ADR premium. In other words, the results of the above regression are not statistically significant.

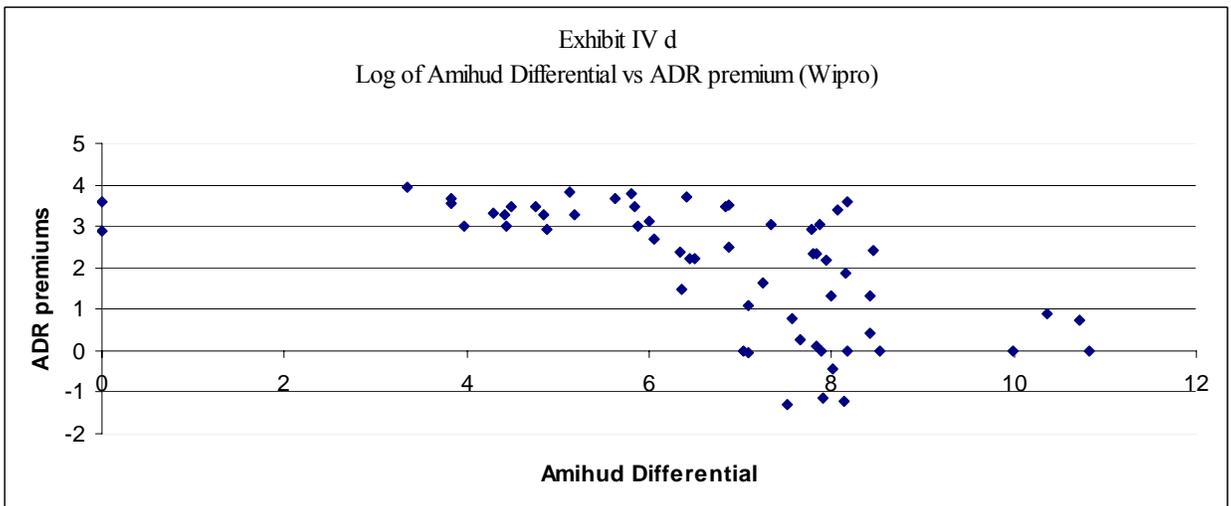
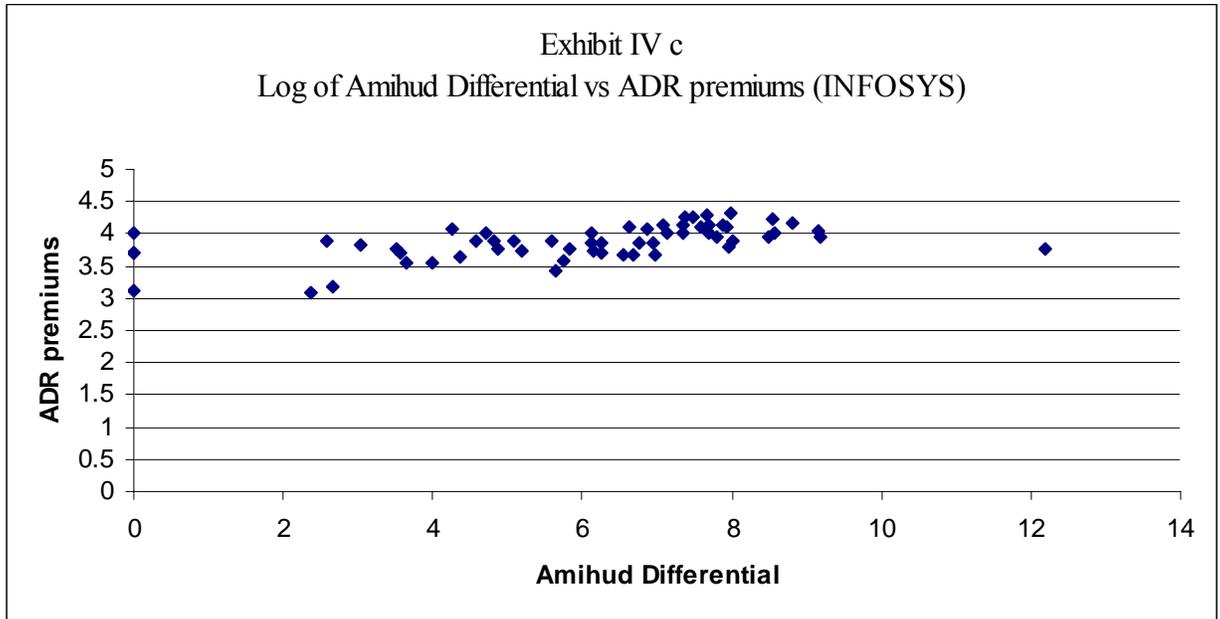
We have also attempted similar regressions for individual ADRs viz. WIT, INFY and IBN. The results are not materially different from those obtained by using the aggregated data.

A summary of results is presented Exhibit IV b (refer **Appendix II** for details)

We also present in Exhibit IV c & d, scatter plots of the log of differential between the Amihud measures of ADRs and underlying equity versus the ADR premiums for two Indian ADRs, Infosys and Wipro. We plot the monthly data for the period January 2001 to December 2005. As the plots show, it is difficult to say conclusively that there exists a significant relationship between the illiquidity measure and ADR premiums.

**Exhibit IV b**

<b>Company</b>	<b>T-stat</b>	<b>P-value</b>	<b>R-sq.</b>
Wipro	2.87	0.60%	12.40%
Infosys	0.20	84.40%	0.10%
ICICI Bank	1.68	9.80%	4.70%



The above analyses lead us to conclude that liquidity is not an important factor for predicting the premiums of ADRs prices over the prices of underlying equity.

## Currency Risk

### Exhibit IV e Indian Rupee Depreciation

Year	versus USD	versus GBP	USD vs GBP
1996	2.1%	12.1%	-8.9%
1997	9.3%	6.1%	3.0%
1998	8.2%	8.8%	-0.5%
1999	2.4%	-0.2%	2.6%
2000	7.3%	-0.9%	8.3%
2001	3.5%	0.6%	2.9%
2002	-0.6%	9.9%	-9.5%
2003	-5.1%	5.2%	-9.8%
2004	-4.1%	3.9%	-7.7%
2005	3.4%	-7.7%	11.9%
Average	<b>2.6%</b>	<b>3.8%</b>	<b>-0.8%</b>
Median	<b>2.9%</b>	<b>4.5%</b>	<b>1.0%</b>
High	<b>9.3%</b>	<b>12.1%</b>	<b>11.9%</b>
Low	<b>-5.1%</b>	<b>-7.7%</b>	<b>-9.8%</b>

*Data Source: Yahoo.co.in, www.oanda.com*

In case arbitrage is possible, any individual / corporate / institutional investor can invest in India freely through a sub-account with an FII, and convert it into ADR, rather than invest directly in a higher-priced, same-risk ADR. Any premium that exists may be partially due to Currency risk premium. In other words, the ADRs eliminate expected losses to investors due to depreciation of Indian Rupee (INR) versus USD (US Dollar). ADRs may trade at a premium because of this fact.

Since Indian Rupee has been traditionally weak versus USD, the currency depreciation will partially explain higher ADR prices. Currency risk is primarily the expected depreciation in the Indian Rupee over and above the depreciation expected due to interest rate differentials. This currency risk premium should partially account for ADR premiums. Again, over the last 4 years, the dollar has depreciated versus rupee, not

entirely due to the relative strengths of US and Indian economies but primarily because of general weakening of USD. We, therefore, examine the currency movements of Indian rupee (INR) versus USD, INR versus GBP, and Euro versus INR, over last 10 years, to gauge “general” rupee depreciation (and hence the currency risk).

Since the USD itself has depreciated on an average 0.8% versus GBP, INR depreciation versus GBP is a better indicator of average depreciation. Therefore, the actual currency risk (i.e. average depreciation expected, based on past currency movements) for INR is 3.8% per annum (refer Exhibit IV e). We, of course, assume here that (1) the average investment horizon (or holding period) for investors is 1 year, and (2) the currency movements of past 10 years form an appropriate basis for investor expectations about future currency depreciation and average depreciation of INR in the past is a good proxy for expected depreciation in future.

Given the above, if average depreciation expected for INR is approximately 4%, the currency risk explains only a small portion of ADR premium. It may be mentioned here that ADR premium on Indian ADRs average 17% over last 5 years, which implies that only a small proportion of ADR premium is explained by currency risk premium.

## **Cost for transactions / procedural hassles**

Cost of procedural hassles is more of a subjective issue and is difficult to assign a value to such a variable. In any case, the cost of any procedural hassle cannot be as high as premiums of 17% for any rational investor. In other words, it seems unlikely that high ADR premiums for Indian securities can be ascribed to procedural hassles. It is important to note that procedural hassle is same for all securities, whereas ADR premiums vary greatly for different ADRs and are negative for some of them (e.g. Dr Reddy's (RDY) and Tata Motors (TTM)).

## Segmented Markets / Market Inefficiency

As we have mentioned earlier, ADRs are a pure derivative of the underlying equity with exactly similar cash flow and dividend rights. In other words, the risk-return characteristics of ADRs and underlying equity are same. Given this fact, if the prices of the ADR and the underlying equity still differ, it may be attributed to difference in investor preferences i.e. a market irrationality. In this context regard, we would like to mention the three comparable cases in contemporary finance that we touched upon in Section I (Introduction) –

- *Royal Dutch/ Shell group conundrum* – From 1907 till June 2005, Royal Dutch Shell group was a joint venture between Royal Dutch Petroleum Company (RDP) of the Netherlands and the Shell Transport and Trading Company plc (STT) of UK in the ratio 60:40. These two companies jointly owned all the operating companies in the group (and nothing else i.e. no other assets) and all earnings was always divided 60/40 in favor of Royal Dutch. However, the market prices of RDP and STT were never in the ratio of 60:40, even though both companies had claim to exactly the same cash flows (in 60:40 ratio), with similar risk-return characteristics. The difference in dividend policies of RDP and STT has been put forward as a possible reason for difference in share prices of RDP and STT (after adjusting for shareholding ratio in JV). However, a crucial difference here is that, in the case of ADRs, the dividend cash flows for ADRs and the underlying equity are *exactly* equal.



- *3Com/Palm case* – On September 13, 1999 3Com announced its intentions to take one of its subsidiaries, Palm Computing (a leading manufacturer of handheld devices), public the following year. On March 2, 2000 Palm became publicly traded on the Nasdaq National Market. 3Com sold a 6% stake at \$38 a share which was well above the initial \$14 to \$16 range. At the time of the IPO, 3Com announced its intention to divest its remaining 94% ownership to 3Com shareholders within six months. On the first day of trading, Palm opened at \$145, reaching a high of \$165 before ending the day at \$95.06. This stock price translated to a \$53.4 billion value for Palm in contrast to 3Com’s \$28.5 billion value. Based on 3Com’s 94% ownership, 3Com’s stake in Palm was worth approximately \$50 billion, giving substantial negative value to 3Com’s other assets, an almost perfect violation of the law of one price.<sup>1</sup>

A possible explanation for this anomaly has been the restrictions on arbitrage i.e. short selling Palm (and going long 3Com), due to a very small number of Palm shares available in the market. This effectively made arbitrage very difficult. In context of this paper, it is worth stating that although Palm was a part of 3Com but did not share the risk-return characteristics of 3Com in entirety (unlike ADR-underlying equity combination)

Further, since 3Com had announced its intention to divest Palm completely within six months, the arbitrage had to necessarily go away at the time of divestment i.e. 3Com

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<sup>1</sup> “The Valuation and Market Rationality of Internet Stock Prices” – Ofek & Richardson, 2001  
“The Parent Company Puzzle – When is the whole less than one of its parts?” – Cornell & Liu, 2000

and Palm share prices (adjusted for share exchange ratio) had to converge. In contrast, in case of ADRs, there is no event (like divestment / merger) that would necessarily cause the prices of the underlying and the ADR to converge.

In any case, the three cases above do provide though provoking examples of market inefficiencies, where securities with similar risk-return characteristics were valued very differently by same / different investors. Continuing this line of thought, we propose that a possible reason for the continued existence of ADR premiums is the difference in perceptions of the investors in US markets versus the investors in Indian markets.

Although difficult to substantiate, this implies that there is a distinct dichotomy in the way these two markets are behaving as regards ADR premiums. Given the fact that there are no information asymmetries (as regards ADRs) and capital flow restrictions, it seems difficult that segmentation of markets may be a possible cause of ADR premiums.

However, as we discussed in Section III, the absence of sufficient “headroom” is causing significant barriers to arbitrage and a veritable impediment to free flow of capital i.e. a segmentation of US and Indian stock markets. In the absence of sufficient “headroom”, arbitrage between the higher ADR prices and lower underlying equity prices seems quite difficult, which has allowed the ADR premiums (i.e. a market inefficiency) to persist for a long time. The magnitude of ADR premiums and the high correlations of certain ADRs (with relatively higher premiums) to S&P 500 seem to indicate the difference in investor expectations in US and India as a possible cause of ADR premiums.

## V EPILOGUE

### Current Data

February 1 (Bloomberg) -- The following table of American and global depository receipts of Indian companies compares their closing prices with the most recent closes in local trading. Price adjustments are based on a currency value of 44.12 rupee per dollar, along with the number of shares per ADR or GDR.

\*T

Company	Ticker	ADR/GDR	Close	% Chg	Local Equiv.	Local Close	ADR/GDR % Prem	Shares/ ADR/GDR
Dr Reddy's	RDY		25.60	+0.24	1,129.42	1,119.60	+0.88	1.0
HDFC Bank	HDB		59.44	+4.56	874.12	762.55	+14.63	3.0
ICICI Bank	IBN		31.42	+0.03	693.09	609.15	+13.78	2.0
Infosys Technologies	INFY		76.22	+1.09	3,362.67	2,879.70	+16.77	1.0
MTNL	MTE		7.36	-0.68	162.35	141.70	+14.58	2.0
Ranbaxy Labs	REXD		9.23	+0.87	407.21	399.10	+2.03	1.0
Reliance Industries	RIGD		33.50	+0.66	738.98	713.70	+3.54	2.0
Satyam Computers	SAY		39.20	-0.73	864.71	746.65	+15.81	2.0
State Bank of India	SBID		46.17	-3.41	1,018.46	886.80	+14.85	2.0
Tata Motors	TTM		16.06	+2.23	708.54	709.30	-0.11	1.0
Wipro	WIT		14.85	+1.23	655.15	529.90	+23.64	1.0

The ADR premiums have declined further since July 2005 (when we initiated the research). For Infosys itself the premium is down from 39% to 16.7% currently. Given the fact that INFY ADR premium has been, on an average 50% in last 5 years, and was as high as 39% in July 2005, a decline of 23% is phenomenal indeed. Other ADRs that have experienced similar trend (though not as spectacular) are RIGD (average - 37%, current - 4%), SAY (average - 23%, current - 16%) and SBID (average - 22%, current - 15%).

The average ADR premium is down to 11% now, which is a significant decline. Even though real arbitrage seems difficult in case of Indian ADRs, it is possible for investors to short the ADRs in US, go long the Indian equity and invest the difference in risk-free securities. Since the correlation between ADRs and underlying equity is over 90%, the equity risk is somewhat hedged in such a transaction (even though the beta of ADR for underlying equity is 0.56). Also, ADR premium should more than compensate investors for the hedging cost of currency risk. The balance amount is, of course, “quasi” - arbitrage profit. Of course, such a transaction is predicated on the investors receiving the proceeds of short sale and borrowing costs (of ADRs short sold) being minimal.

## **Summary**

We summarize the results of our analyses with the following observations.

Premiums on ADRs of Indian companies have been in existence for some time (around 5 years, starting 1999 till date), and the phenomenon is unique to Indian ADRs, vis-à-vis ADRs from other countries. Although, the ADR premiums have been trending down for some time lately, the average premium was still around 16% in 2005. The ADRs returns appear to be more sensitive to US stock markets, than the Indian stock markets and the underlying equity. More interestingly, the ADR prices do not move in lock-step with the prices of underlying equity, despite sharing exactly the same risk-return characteristics.

Certain institutional framework issues (viz. insufficient “headroom”) have had a substantial impact on the existence ADR premiums, in that these issues make it difficult for investors to take advantage of ADR premiums via arbitrage. Our research indicates that the impact of liquidity and currency risk premium on ADR premiums is relatively insignificant. A possible reason (though not conclusive) for such premiums does appear to be segmented markets, which does indicate market inefficiency, to a degree. In this context, we compare the phenomenon of ADR premiums to the Royal Dutch / Shell share prices, the Closed End fund puzzle, and the 3Com-Palm case. In all the three cases, securities with similar risk-return characteristics were valued differently by investors.

Further, the fact that ADR premiums are declining can have the following possible analyses:

- (1) Arbitrageurs have been able to effect quasi-arbitrage, which enables them to circumvent the barriers to arbitrage in institutional framework (described in Section III), and /or
- (2) The market inefficiency is being corrected gradually, or the segmented market hypothesis is being eliminated as investor expectation finally converge in US and Indian markets.

## APPENDIX I

<b>Description<sup>1</sup></b>	<b>India</b>	<b>Hong Kong<sup>2</sup></b>	<b>Germany</b>	<b>South Korea</b>
Portfolio Investment	Foreign institutional investors (FIIs) may invest directly in all securities traded on the primary and secondary markets in India, subject to certain caps	No specific restrictions apply to portfolio investment, and foreign investors may place funds directly in the stock and bond markets.	No obstacles exist to raising and moving capital in Germany.	Markets totally liberalized since 1997 crises. Even unlisted stocks and derivatives available for unlimited foreign investment. No individual or aggregate ceilings exist.

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1 Source: Economist Intelligence Unit, The Economist

2 The underlying stock for ADRs of Chinese shares on the US stock exchanges are the shares of Chinese companies listed on Hong Kong Stock Exchange (called 'H' shares). These shares have been issued primarily for foreign investors, trade at a lower PE compared to shares listed on the Chinese Stock Exchanges (called 'A' & 'B' shares) and are subject to securities markets rules of Hong Kong.

Repatriation of Capital	Repatriation of portfolio investments is permitted on the same terms to all classes of non-resident investors. Under the Foreign Exchange Management Act, for portfolio investments made in secondary markets, repatriation of capital is allowed freely.	No restriction on the amount of local currency or foreign currency that can be brought into or taken out of Hong Kong.	No restrictions or special regulations apply.	Free repatriation of approved capital is guaranteed by law. Ex post facto reporting rules apply. Legitimacy of origins must be confirmed by remitting forex bank.
Repatriation of Profits/ Dividends	All foreign banks, companies and project offices can remit profits and dividends without permission from the Reserve Bank of India.	No restrictions on payment of dividends or other distributions to overseas or foreign shareholders.	No restrictions or special regulations apply.	Same as repatriation of capital. New legislation makes it for foreign funds difficult to avoid tax on capital gains.

ADR provisions	No approval required from Government for fresh ADR issue; only intimation within 30 days is required. Only limited fungibility of ADRs is allowed.	No restrictions are imposed on listed companies' issuance of GDRs or ADRs.	There is no government-imposed cap on GDR or ADR issuance.	Listed firms have been allowed to issue overseas securities in unlimited amounts since 1998. No special restrictions
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\* We include ADRs of Chinese shares listed on Hong Stock Exchange in our dataset. Therefore, we have analyzed the institutional framework in Hong Kong (and not China) in this report.

## **India<sup>1</sup>**

### **Portfolio Investment**

FIIIs include pension funds, mutual funds, investment trusts, insurance or re-insurance companies, asset-management companies, incorporated institutional portfolio managers, university funds, endowments, foundations and charitable trusts/societies with a track record. Secondary stock market operations are permitted only through registered intermediaries on the Indian stock exchanges. FIIIs are permitted to lend their securities through an approved intermediary.

Portfolio investments are subject to an aggregate ceiling of 24% of paid-up equity capital in one company for registered FIIIs and sub-accounts, with a sub-ceiling of 10% for any one FII. Indian companies can increase this 24% limit up to the FDI cap in the relevant sector, provided the company's board of directors approves the move and the general body of the corporation passes a resolution allowing it. Investments by FIIIs through offshore single/regional funds, Global Depositary Receipts, American Depositary Receipts and euro-convertibles are not counted towards FII limits.

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<sup>1</sup> Economist Intelligence Unit, The Economist

FIIIs that are asset-management companies, investment advisers, nominee companies, institutional portfolio managers, trustees, power-of-attorney holders or banks may invest on behalf of sub-accounts. A sub-account can be a foreign company or individual, an institution, fund or portfolio established outside India. In the case of a fund or portfolio, it must be “broad-based”, meaning that it should have at least 20 investors, with no single individual investor holding more than 10% of its shares or units. The registration process for sub-accounts is simpler: FIIIs need only submit details of sub-accounts, an undertaking and a registration fee of US\$1,000. The SEBI registers them within three working days.

### **Repatriation of capital**

Repatriation of capital is permitted for any class of foreign investor, including non-resident Indians (NRIs) and foreign institutional investors (FIIIs), if the original capital was remitted from abroad in foreign currency and if the equity has been sold on a stock exchange.

This therefore excludes investments in partnerships, which are not listed. However, NRIs can invest in partnership firms on a repatriation basis with government approval. Repatriation of portfolio investments is permitted on the same terms to all classes of non-resident investors. Under the Foreign Exchange Management Act, for portfolio investments made in secondary markets, repatriation of capital is allowed freely.

## **ADR provisions**

From 2000 onwards, companies no longer require approval from the Ministry of Finance for overseas issues, but should inform both the ministry and the exchange-control department of the Reserve Bank of India (RBI) within 30 days of the issue. This rule applies to companies issuing ADRs/GDRs for the first time and those issuing a fresh set of ADRs/GDRs, provided that they issue new equity shares to support the offering and expand their capital bases. This automatic route also applies to the issue of employee stock options in the form of ADRs/GDRs by Indian software and other IT companies.

In February 2002 the RBI permitted limited two-way fungibility of ADRs/GDRs, meaning that ADRs or GDRs that have been converted into local shares can be converted back into ADRs or GDRs. This applies only to re-conversions. In November 2002 the RBI allowed Indian companies to sponsor ADR/GDR issues with overseas depositories against the shares held by their shareholders. In February 2003 it further said that resident shareholders that offer their shares for such conversions could receive the proceeds in foreign currency.

As per limited fungibility, any broker can convert shares to ADR but only to the extent of past conversion of ADRs in that company into shares. This is called 'Headroom'.

So up to the point that headroom is not fully utilized, anybody can buy in local market and convert to ADR and pocket the profit.

The other way to convert local shares to ADRs is very cumbersome and time consuming. This also requires regulatory permission. Also, the company has to pass a special resolution and appoint a merchant banker and make sure that an opportunity is given to all the shareholders to participate in this process.

## **Hong Kong<sup>1</sup>**

Hong Kong, subject to Chinese sovereignty but not its legal jurisdiction, has been good source of funds for companies in mainland China. More than 150 mainland companies were listed there in July 2005. The China Securities Regulatory Commission (CSRC) must examine and approve companies that intend to issue Hong Kong-listed H-shares. Furthermore, they need to bring their articles of association and their activities into conformance with the provisions of the Company Law, in addition to the necessary clauses for the articles of association of companies to be listed in Hong Kong.

## **ADR provisions**

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<sup>1</sup> Economist Intelligence Unit, The Economist

As per regulations, the depositary banks can create ADRs if investor(s) deliver H shares along with payment of applicable issuance fees/ taxes/ other charges. Additionally, investors are entitled to present ADRs to depositary bank for cancellation and then receive corresponding number of underlying shares, on payment of applicable cancellation fees/ taxes/ other charges.

## **Germany<sup>1</sup>**

### **Portfolio Investments**

Foreign corporations and non-residents are free to acquire securities of any maturity. These include German stocks, bonds, money-market instruments or any other portfolio instruments. There is substantial liquidity in government bonds, Pfandbriefe (asset-backed, particularly mortgage bonds), and blue-chip stocks, and a growing interest in corporate bonds, too.

## **South Korea<sup>2</sup>**

### **Portfolio investment**

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<sup>1</sup> Source: Economist Intelligence Unit, The Economist

<sup>2</sup> Source: Economist Intelligence Unit, The Economist

Foreign portfolio investment is governed by the Foreign Exchange Transaction Act and the Securities and Exchange Act. Foreign portfolio investment began with the opening of the country's equity market in 1992. Bonds and money-market instruments were off limits to foreign investors until late 1997. The closed markets were due to apprehensions regarding the large gap between prevailing international and domestic interest rates (once more than 5 percentage points above US Treasuries) which could have caused a flood of "hot" money.

The financial crisis of 1997 completely changed the scenario and during 1998–99, foreign portfolio investment in local stocks, bonds and money-market instruments was almost completely liberalized, as follows:

- Since December 1997 foreign investors have been allowed to invest in listed public and corporate bonds without restrictions.
- Since May 1998 the money market has been completely opened up to foreign investment, with certificates of deposit, repurchase agreements and other instruments freely traded for foreign investors' accounts. (Commercial paper and trade bills became available in February 1998.)
- Since May 1998 foreign investment in stocks listed on the Korea Stock Exchange and the Kosdaq market (both of which are now part of the Korea Exchange) has been fully liberalized, with no individual or aggregate ceilings. Futures and options are also freely available, and foreigners can also subscribe to rights issues.
- In July 1999 unlisted stocks and bonds became available for unlimited foreign investment.

Foreign portfolio investors can also invest in stock or bond investment trusts and mutual funds. A purchase of a stake of less than 10% in a South Korean company by a non-resident investor must be reported to a relevant forex bank. If it involves a stock swap (listed stocks only), then the Bank of Korea must be notified.

### **Repatriation of capital**

Free repatriation of approved capital is guaranteed by law. No restrictions or requirements exist for reinvestment of profits. However, the forex bank that transfers repatriated capital must confirm the legitimacy of its origins. All remittances must be made from the same account at a designated forex bank, a rule that also applies to personal remittances. Ex post facto reporting rules set by the Foreign Exchange Transaction Act apply.

### **Remittance of dividends and profits**

Free remittance of dividends and profits is guaranteed by law. However, forex banks conducting business with the foreign investors must verify the legitimacy of such remittances. Ex post facto reporting rules set by the Foreign Exchange Transaction Act apply.

New legislation is making it more difficult for foreign funds—most notably US investment funds—operating from tax-haven outposts around the world to take profits out of South Korea in tax-free dollars under the conventional protection of bilateral tax treaties. A new special provision written into the existing Law for the Co-ordination of International Tax Affairs allows the National Tax Service (NTS) to levy local withholding taxes on

dividends, interest, and capital gains collected by foreign funds registered in some tax-haven jurisdictions, irrespective of any bilateral tax treaties that permit tax-free repatriation of profits. The measure, included in South Korea's annual tax-reform package effective in January 2006, should affect the operations of private-equity funds and other investment funds doing business in South Korea.

### **GDRs/ADRs provisions**

Global Depositary Receipts (GDRs) and American Depositary Receipts (ADRs) are available and are a popular source of overseas funds for South Korean firms. GDRs/ADRs issued by blue-chip companies such as POSCO, Korea Electric Power, Samsung Electronics, Hyundai Motor and KB (Kookmin Bank) are traded on exchanges in New York, London and Luxembourg.

Listed firms have been allowed to issue overseas securities in unlimited amounts since 1998, and practically all remaining restrictions on GDR/ADR issues (such as minimum dividend pay-outs) disappeared in that year. Companies seeking to issue GDRs/ADRs based on their own shares bought back from shareholders can do so immediately after they complete the buyback program. GDRs/ADRs can be issued in private placements. Since 2001, companies have been able to offer GDRs/ADRs at a discount larger than the official limit of 30%, with approval from the Financial Supervisory Commission.

## APPENDIX II

### Regression Analysis: Wip D (ADR premium) versus Wip A (Amihud measure differential)

The regression equation is  

$$\text{Wip D} = 0.184 - 0.000555 \text{ Wip A}$$

Predictor	Coef	SE Coef	T	P
Constant	0.18441	0.01984	9.29	0.000
Wip A	-0.0005547	0.0001934	-2.87	0.006

S = 0.142236    R-Sq = 12.4%    R-Sq(adj) = 10.9%

#### Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	0.16641	0.16641	8.23	0.006
Residual Error	58	1.17341	0.02023		
Total	59	1.33982			

#### Unusual Observations

Obs	Wip A	Wip D	Fit	SE Fit	Residual	St Resid
7	506	-0.0200	-0.0965	0.0923	0.0765	0.71 X
8	317	0.0200	0.0083	0.0569	0.0117	0.09 X
10	450	0.0200	-0.0650	0.0815	0.0850	0.73 X
46	0	0.5100	0.1843	0.0198	0.3257	2.31R

R denotes an observation with a large standardized residual.  
 X denotes an observation whose X value gives it large influence.

### Regression Analysis: Infy D (ADR premium) versus Infy A (Amihud measure differential)

The regression equation is  

$$\text{Infy D} = 0.498 - 0.000012 \text{ Infy A}$$

Predictor	Coef	SE Coef	T	P
Constant	0.49758	0.01578	31.53	0.000
Infy A	-0.00001216	0.00006152	-0.20	0.844

S = 0.120107    R-Sq = 0.1%    R-Sq(adj) = 0.0%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	0.00056	0.00056	0.04	0.844
Residual Error	58	0.83670	0.01443		
Total	59	0.83726			

Unusual Observations

Obs	Infy A	Infy D	Fit	SE Fit	Residual	St Resid
23	29	0.7600	0.4972	0.0155	0.2628	2.21R
25	1977	0.4400	0.4735	0.1197	-0.0335	-3.38RX
58	-0	0.2300	0.4976	0.0158	-0.2676	-2.25R
59	0	0.2400	0.4976	0.0158	-0.2576	-2.16R
60	0	0.2200	0.4976	0.0158	-0.2776	-2.33R

R denotes an observation with a large standardized residual.  
 X denotes an observation whose X value gives it large influence.

**Regression Analysis: IBN d (ADR premium) versus IBN A (Amihud measure differential)**

The regression equation is  
 IBN d = 0.123 - 0.000280 IBN A

Predictor	Coef	SE Coef	T	P
Constant	0.12327	0.01044	11.81	0.000
IBN A	-0.0002799	0.0001663	-1.68	0.098

S = 0.0758329    R-Sq = 4.7%    R-Sq(adj) = 3.0%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	0.016282	0.016282	2.83	0.098
Residual Error	58	0.333537	0.005751		
Total	59	0.349818			

Unusual Observations

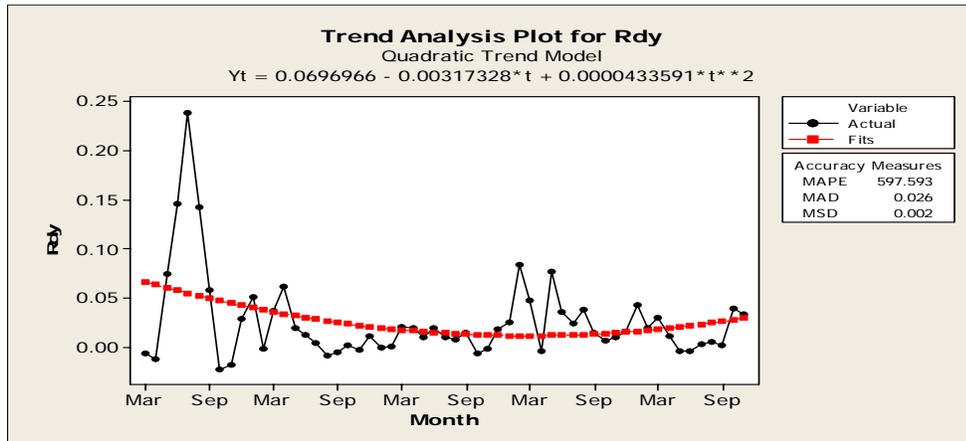
Obs	IBN A	IBN d	Fit	SE Fit	Residual	St Resid
4	7	-0.04000	0.12135	0.01010	-0.16135	-2.15R
6	177	-0.03000	0.07369	0.02763	-0.10369	-1.47 X
7	-0	-0.04000	0.12337	0.01046	-0.16337	-2.18R
9	13	-0.05000	0.11975	0.00991	-0.16975	-2.26R
21	413	0.05000	0.00763	0.06583	0.04237	1.13 X

R denotes an observation with a large standardized residual.  
X denotes an observation whose X value gives it large influence.

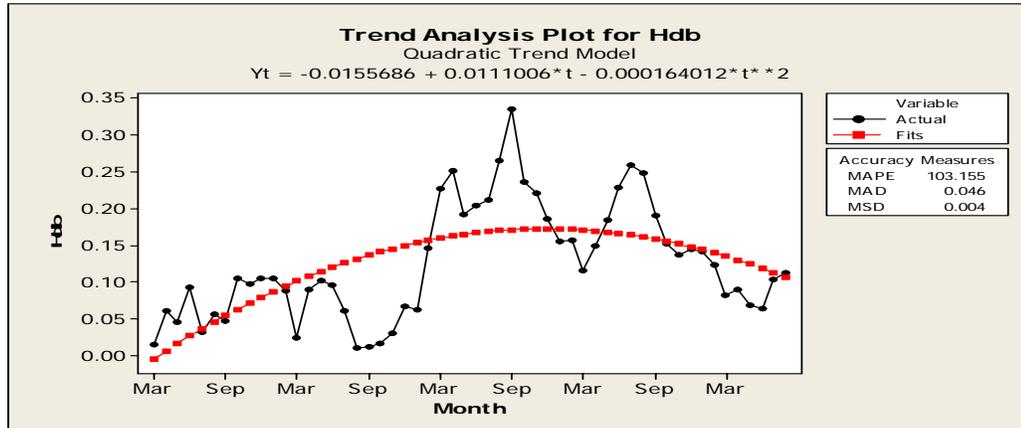
## APPENDIX III

### Trend Analysis of ADR premiums over 2001-2005

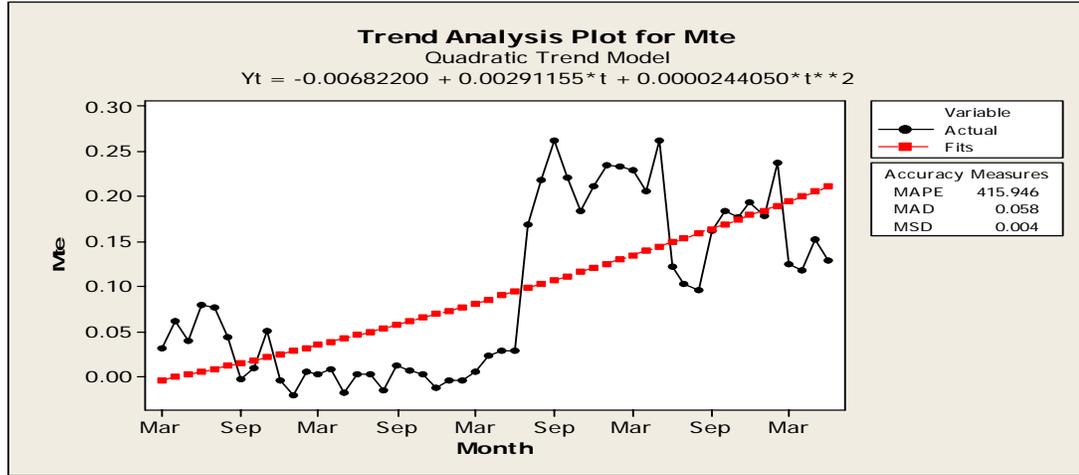
*Dr Reddy's Laboratories (RDY)*



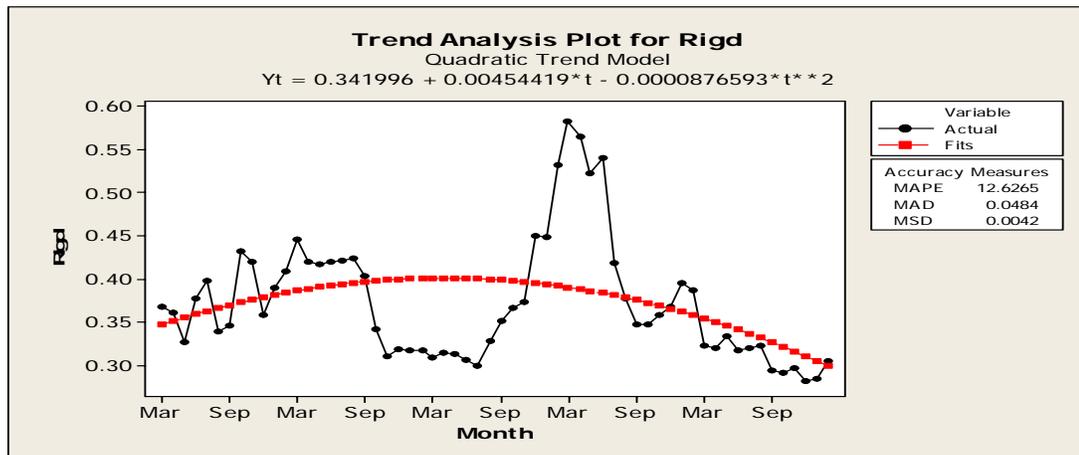
*HDFC Bank (HDB)*



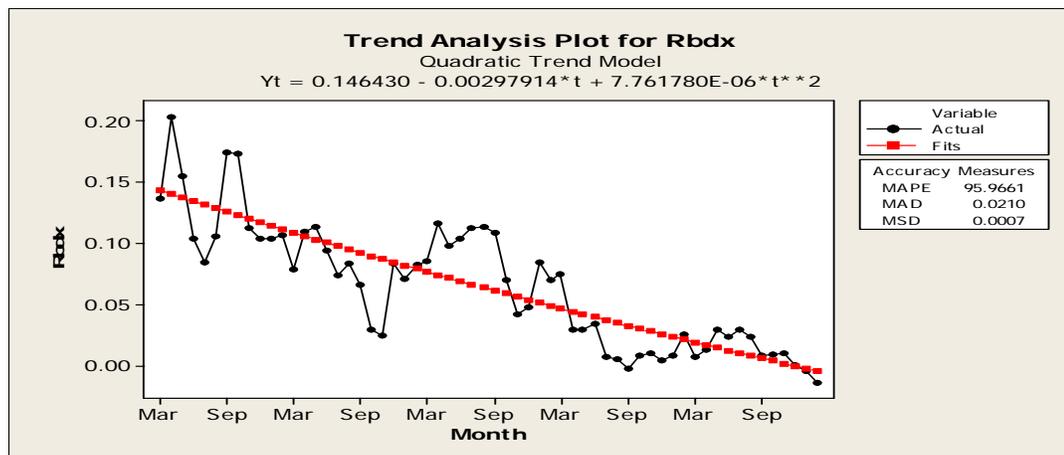
*MTNL (MTE)*



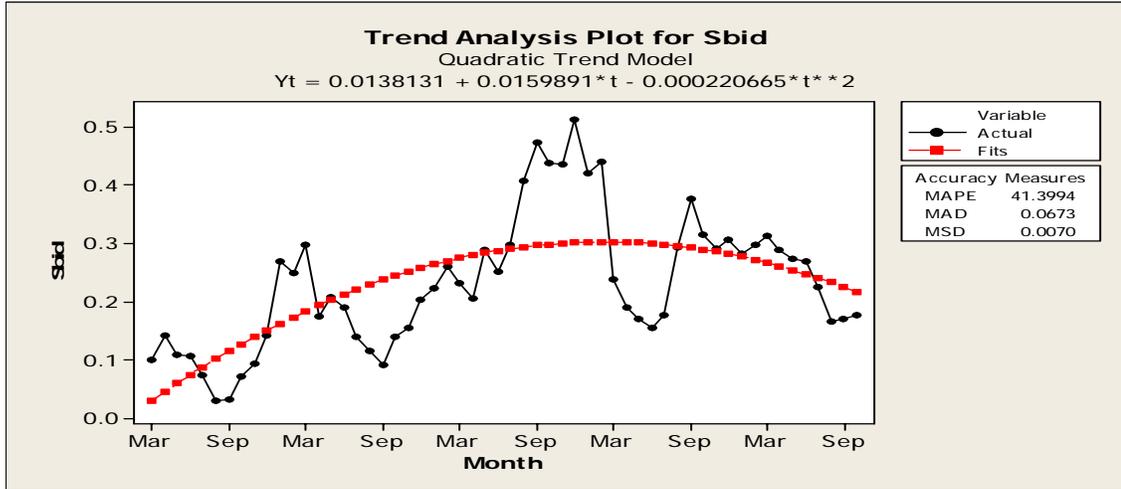
*Reliance Industries (RIGD)*



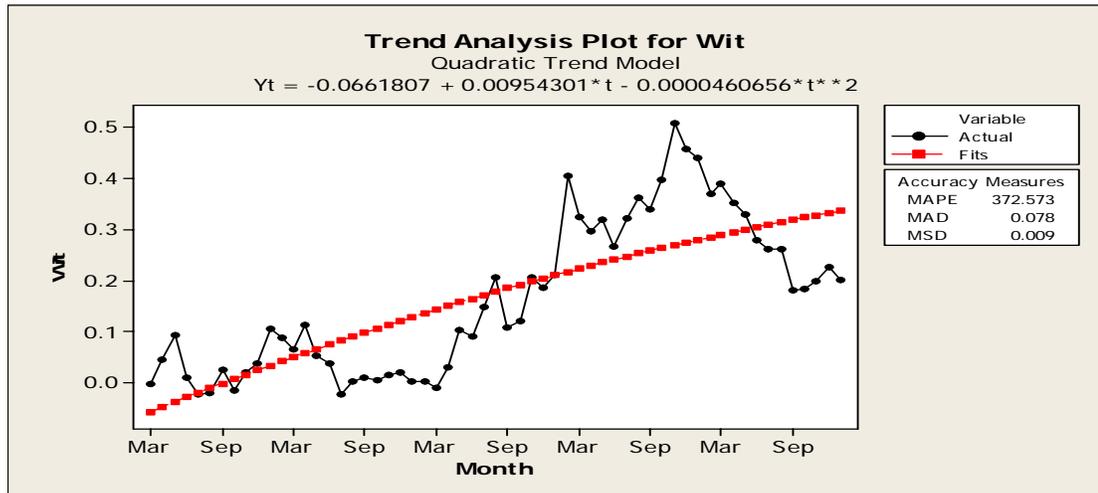
*Ranbaxy Lab (RBXD)*



SBI (SBID)



Wipro (WIT)



Tata Motors (TTM)

