

The Tale of One Market Inefficiency: Abnormal Returns around GDR Issues by Indian Firms

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Abstract

This article relates the experience of abnormal returns on the Bombay Stock Exchange surrounding the pricing date of GDR issues by Indian firms.

On 15 May 1994, empirical evidence suggesting that such abnormal returns do exist was released into the information set of agents in the financial industry. Today, as many GDR issues have taken place after 15 May 1994 as had taken place before, and we can measure how this mispricing has changed.

We find that the extent of mispricing has dropped sharply: the highest point in the average cumulative returns in excess of the market index over the weeks preceding the pricing date have dropped from 18.9% for the 20 GDR issues before 15 May 1994 to 6.9% for the 26 GDR issues after this date. This reduction in the extent of mispricing is consistent with our understanding of arbitrage by rational agents in financial markets.

*This file is <http://www.cmie.ernet.in/~ajayshah/PROSE/ARTICLES/gdr.ps.gz> I am grateful to C. B. Bhavne of SEBI for getting me started on this problem in the first place, and to Venugopal Pillai of CMIE for able research assistance. Mailing address: Centre for Monitoring Indian Economy, 110-120 Kaliandas Udyog Bhavan, Prabhadevi, Bombay 400 025.

From November 1992 onwards, Euro Issues of Global Depository Receipts (GDRs) and Euro Convertible Bonds (ECBs) have become an important mechanism through which Indian firms raise resources from capital markets. In this paper, we focus on GDR issues: \$3.544 billion were raised through the 46 GDR issues which took place between November 1992 and December 1994.¹ The following table will help put these numbers into perspective:

Table 1 Indian Domestic Primary Market

	1990-91	1991-92	1992-93	1993-94	1994-95 Est.
Number of issues	335	572	1038	1168	1400
Value (Rs.blm)	97	135	282	323	330

Thus the total resources raised through GDR issues over two calendar years, at Rs.111 billion, is roughly one-sixth the resources raised in the domestic primary market. The 44 companies involved in these 46 GDR issues have a total market capitalisation as of 20 January 1995 of Rs.0.9 trillion, as compared to the total market capitalisation of the BSE of Rs.4.7 trillion.

The basic informational asymmetries of the public offering process are accentuated in the case of Euro issues. Purchases at Euro issues are new to the issuing company, and often make a decision based on the prospectus, roadshows, and peer recommendations. This is in contrast with the domestic primary market, where the track record of the issuing company is very well known to domestic investors.

1 Abnormal returns before 15 May 1994

In April 1994, we set out to explore whether unusual price movements took place around Euro issues. We explored two definitions of the event date here: the date of the board meeting which agrees to issue shares in this fashion, and the date on which the GDRs are priced. The pricing date appears to be much more important in defining the abnormal returns.

Our dataset at the time consisted of both GDR and ECB issues, and there were 24 issues at the time. Even though the pricing date was known exactly, weekly returns were used with market model adjustment, using the BSE Sensex as the market index. We discovered evidence of mispricing – the peak abnormal returns were 9% shortly before the pricing date. Even

¹As of 20 January 1995, the exchange rate was Rs.31.37 per US dollar. The rupee has been stable at this price for over a year.

though this was a small dataset of only 24 events, the mispricing was large enough to pay attention to. We also found that cumulative abnormal returns go back to 0 over the eight weeks following the pricing date.

2 Results enter the information set of agents

On 13 May 1994, a techreport containing these results (Shah 1994) was sent to 75 individuals on a private distribution list in the Indian finance industry. Hence we define 15 May 1994 as the threshold at which it entered the information set of agents. The distribution list included a diverse array of individuals in merchant banking, regulators, foreign investment finance companies, etc.

This techreport suggested that price manipulation might be at work in these abnormal price movements. If the valuation of the firm rose as a consequence of the Euro issue, then the positive returns should not be reversed in the following eight weeks. This interpretation of the evidence is consistent with the cross-sectional variation in CAR as of date -5 : small firms exhibited much greater mispricing than large firms.

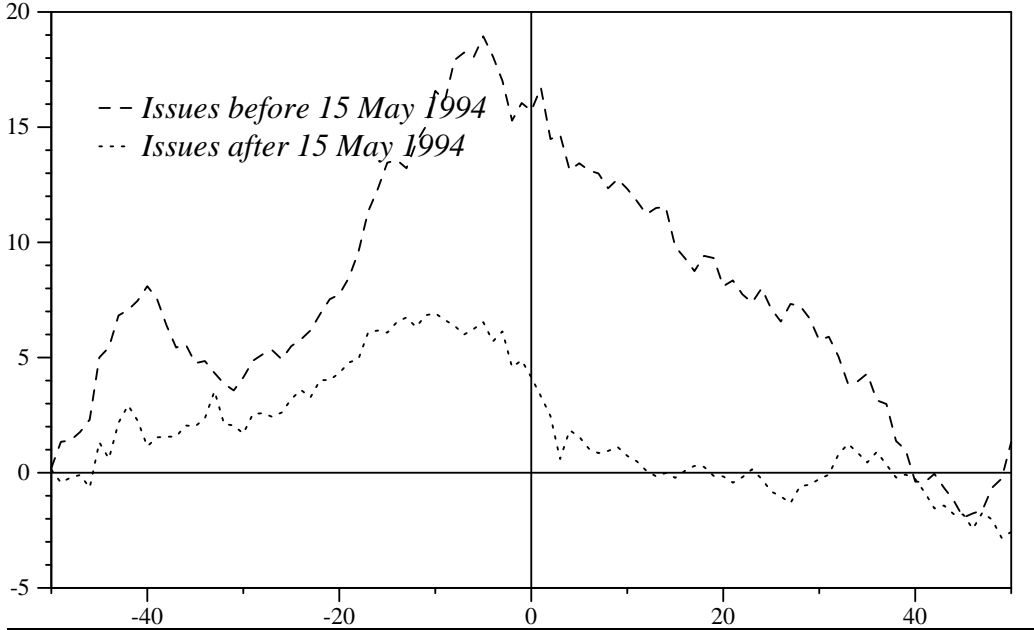
The last section of the techreport was discussed a variety of portfolio management strategies which could exploit this mispricing.

The results were quickly picked up by the mass media. The results of this techreport were featured or mentioned in *The Economic Times*, *The Times of India*, *Financial Express*, *Investment Week*, *Business Today*, and in the daily *bhav copy* published by the stock exchange. Around two hundred copies of the techreport were requested from CMIE. It would be fair to assume that most agents involved in any aspect of Euro issues by Indian companies – ranging from the issuers and facilitators to the purchasers – knew of the results of this techreport, atleast crudely. Many times, the conclusion “The average CAR across firms shows abnormal returns” was misunderstood to mean “The CAR for every firm shows abnormal returns”. This inaccurate understanding should have served to make agents even more conscious of the abnormal returns.

3 Abnormal returns after 15 May 1994

Twenty six GDR issues have taken place after 15 May 1994, and we can now repeat the event study for this period.

Figure 1 Abnormal returns around Pricing Date (%)



The methodology employed in this graph differs from that used in Shah (1994). This uses daily returns instead of the weekly returns used earlier, and hence uses market adjustment instead of market model adjustment.

Earlier, the commonly used BSE Sensex market index had been used. This has numerous difficulties: a unchanging set of 30 companies which now account for only one-fifth of the market capitalisation of the BSE, and both conceptual and computational errors in how the BSE calculates the index itself. Instead, we created a value-weighted returns index using the 250 largest market capitalisations as of 28 May 1992². This improved index has been used in doing market adjustment for this edition of the results.³

²State Bank of India was dropped from this set even though it features in the largest 250 companies by market capitalisation.

³The reader may be uncomfortable about the sensitivity of these results to a new index. The first point to note is that the index selection criterion is applied on 29 May 1992 (at the end of the scam) and not today, this diminishes the possibility of selection bias.

The properties of the two indexes can be compared in terms of the standard deviation of ϵ obtained for the 46 companies at hand in the context of market adjustment, i.e. $\sqrt{\text{Var}(r_j - r_M)}$.

Market Index Used	Mean	Median	Minimum	Maximum
BSE Sensex	3.237711	3.07257	1.42292	14.5737
Index-250	3.148268	2.95613	1.34639	14.5662

This shows that the statistical efficiency obtained in our CAR graphs is superior when working with Index-250.

Abnormal returns in the period before 15 May 1994 are much sharper than perceived earlier – the highest abnormal returns seen before pricing date is 18.9% instead of the 9% reported in Shah (1994). This is partly the effect of working with daily returns instead of weekly returns : using friday-to-friday weekly returns involves averaging over many companies which have pricing dates which are a few days apart, and this averaging blunts the perceived average abnormal returns.

How do abnormal returns in the period after 15 May 1994 differ from abnormal returns in the period before this date? The price rampup for the issues after 15 May 1994 is much more muted than the issues before. The highest point in the average CAR graph is at 6.9%, a reduction of twelve percentage points. The pre-pricing-date price rampup is now finished around fifteen days before pricing date, whereas earlier it reached its peak around five days before pricing date. The post-pricing-date elimination of the mispricing is now much faster: earlier it took forty days for the average CAR to return to zero; in the period after 15 May 1994, the average CAR reaches to essentially zero on day 3.

4 Cross-sectional analysis

What explains the cross-section of abnormal returns prior to GDR issues? Hypothetically, it could just be the case that GDR issues prior to 15 May 1994 were structurally different from those which took place after, in a way which would explain the difference in the two CAR time-series shown above.

We would expect size to be associated with market efficiency; it is likely to be much costlier to manipulate the prices of high market capitalisation stocks. In the period before 15 May 1994, we would expect listing category to also matter, because the transactions cost faced by arbitrageurs were smaller for A group companies where some kind of forward trading was possible. However, from 12 March 1994 onwards, the microstructure of trading for both A and B group securities has been identical, so the impact of listing category upon transactions costs would be eliminated.

We will exhibit four OLS regressions below, each of which uses the abnormal returns between day -30 and day -5 as the left hand side variable. Standard errors are shown in brackets.

Table 2 Models explaining AR from day -30 to day -5

	Before	After	Pooled	
	M1	M2	M3	M4
Intercept	1.2212 (0.466)	1.4796 (0.192)	1.2256 (0.220)	1.4090 (0.223)
Log size	0.0102 (0.067)	-0.0684 (0.031)	-0.0149 (0.034)	-0.0301 (0.033)
A group	-0.2489 (0.112)	0.0764 (0.068)	-0.0682 (0.069)	-0.0764 (0.066)
After				-0.1256 (0.054)
N	20	26	46	46
R^2	0.2782	0.1852	0.0628	0.1706

Model M1 suggests that in the period before, listing category mattered, and after controlling for listing category, size did not matter. In part, here, we are seeing listing category act as an instrument for size since larger companies tend to be in the A group.

In the period after 15 May 1994, the microstructure of trading was the same for companies belonging to the A group and for the B group. Here, in Model M2, we see that listing category does not matter while size matters.

In the pooled dataset, the specification using size and listing category (Model M3) fares poorly. Both coefficients have the correct sign but are not statistically significant, and the explanatory power of the regression is very poor.

Model M4 includes a dummy variable which is true if the issue took place after 15 May 1994. This turns out to have a t statistic of 2.34, and suggests that after controlling for size and listing category, the abnormal returns from day -30 to day -5 were diminished in the period after 15 May 1994 by a factor of 12.56 percentage points as compared with the period before.

5 Conclusion

This entire episode serves as an illustration of the *process* through which market efficiency comes about – the discovery of a market inefficiency initiates the process of agents learning the stochastic environment from a new angle, and their arbitrage efforts eliminate the mispricing. Like the well-publicised recent research into NASDAQ quotes (Christie & Schultz (1994), Christie, Harris & Schultz (1994)), it is a demonstration of how the very act of better understanding an economy populated by optimising agents can change it.

There are two important unanswered questions which deserve further exploration.

1. In the period before 15 May 1994, who initiated the alleged price manipulation, and how did they benefit from it? This is a puzzle because even in this period, the average CAR returns to zero, suggesting that the original shareholders of the company were left with no long-term returns as a consequence of the alleged price manipulation. It is not clear how such behaviour benefited the existing shareholders.

We will offer two conjectures here: price rigging initiated by the management or price rigging initiated by the merchant banker.

In a world where management teams compete to convey their worth to shareholders, obtaining a good price at a GDR issue might possibly have constituted a signalling strategy for management. In India, however, the top management of almost all companies is composed of a family which has a large ownership stake in the company. This helps reduce agency conflicts. In this case, it is hard to reconcile price rigging by management with the fact that at the end of the event window, the average CAR returns to zero.

The other possibility focusses on the merchant banker. When a firm decides to conduct a GDR issue, merchant bankers compete to promise the highest pricing range. The winner in this informal bidding process might often suffer from a winners curse, and might then resort to price rigging in an attempt to deliver the promised price range.

2. While the peak mispricing in the period after 15 May 1994 is twelve percentage points smaller than that observed in the period before, why is it not zero? The information that a company is planning a GDR issue is available to a subset of those in the investment finance industry at least a month before the GDR issue itself takes place. This exploration is likely to lead us into the unique microstructure difficulties of arbitrage on the BSE.

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