J. of Multi. Fin. Manag. 24 (2014) 43–59

Contents lists available at ScienceDirect

Journal of Multinational Financial Management

journal homepage: www.elsevier.com/locate/econbase

Transmission of pricing information between level III ADRs and their underlying domestic stocks: Empirical evidence from India

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ARTICLE INFO

Article history:
Received 12 November 2012
Accepted 10 December 2013
Available online 17 December 2013

JEL classification:
F3
G1
G3

Keywords:
ADRs
Information transmission
Co-integration
Market-efficiency

ABSTRACT

This paper studies the price interdependence and transmission pattern between a group of level III American Depository Receipts (ADRs) and their respective underlying stock prices in India. We investigate the transmission dynamics of pricing information between the ADRs and their underlying stocks. Using a Vector Error Correction Model (VECM) with error correction terms, we find bidirectional transmission of price information flow between the ADRs and their underlying stocks. Our results provide evidence of bidirectional causality between the National Stock Exchange and the NASDAQ/New York Stock Exchange. We find that the ADRs tend to overreact to their own lagged price changes and tend to underreact to the lagged price changes in the underlying domestic stocks.

1. Introduction

With the financial liberalisation reforms initiated in 1991, India, which had remained largely outside the global financial integration, joined the process. Capital market reforms opened up India's

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1042-444X/$ – see front matter
http://dx.doi.org/10.1016/j.mulfin.2013.12.001

domestic equity market to Foreign Institutional Investments (FIIs) and Overseas Corporate Bodies (OCBs) and allowed eligible Indian firms to raise equity capital in international markets in the form of depository receipts and convertible bonds. The globalisation of the Indian stock market is reflected in the sophisticated institutional capacity, facilities and international practices that have served to attract foreign investment flows. By opening up its financial market, India experienced two consequences. First, international capital flows, with entry of FIIs, exerted a positive effect on the Indian market in terms of the availability of capital and market liquidity. Second, the Indian corporate sector was allowed to tap the global market through cross-listing on international exchanges. Indian companies joined the worldwide rush to raise capital by beginning to issue depository receipts in 1992. However, exchange-traded depository receipts of Indian origin have been a relatively recent phenomenon, issued for the first time in 1999.

American Depository Receipts (ADRs) are negotiable certificates issued by US banks (acting as custodians), which represent the ownership of shares in non-US companies. ADRs, therefore, enable US investors to invest in foreign securities and provide a cost-efficient way for foreign companies to tap into the US capital market. As an alternative vehicle for international diversification, ADRs have become popular in the US market.

Global financial integration has interested researchers in studying the dynamics of information transmission between ADRs and their underlying foreign securities (Barclay and Warner, 1993; Jayaraman et al., 1993; Kato et al., 1991; Kim et al., 2000; Wahab et al., 1992). In particular, ADRs provide a unique opportunity to investigate interaction channels between the US and other domestic equity markets, both in synchronous (US and CANADA) and non-synchronous (US and INDIA) settings. The study of ADRs has become an important component of analysing international equity market integration.

ADRs provide a unique opportunity to investigate transmission channels in that they are traded in the US but represent ownership of underlying foreign securities. Cross-listed Indian stocks are traded on the NYSE/Nasdaq and also on the NSE. This circumstance provides for 13 h of trading in total over a 24-hours period, with intermittent 4.5- and 7-hour non-trading periods (Exhibit 1).

Exhibit 1: Trading Hours of Indian (NSE/BSE) Market and US (NYSE/Nasdaq) Markets.[1]

In Indian Standard Times(IST)			
Day 'd'			Day 'd+1'
NSE Opens ↓ 9.30am	NSE Closes ↓ 4.00pm	Nasdaq/NYSE Open ↓ 8.00pm	Nasdaq/NYSE close ↓ 2.30am
←-------------------A given day 't'-----------→			

Therefore, we have a typical case by which to investigate the issues of price transmission, price discovery and market efficiency: the two markets are supposed to be informationally integrated but are characterised by non-synchronous trading of the cross-listed stocks.

In this paper, we examine the transmission of stock price information between ADRs and their respective underlying stocks in the Indian markets. We also aim to investigate the mutual interdependence and Granger causality pattern between the ADRs and their underlying domestic stocks, using ADR data issued by Indian companies.

The remainder of the paper is organised as follows. Section two reviews the literature. Section three describes the data. Section four elaborates on the methodology, presents the results of the stationarity and co-integration tests, and introduces the ARCH and Granger causality methodologies. Section five presents the results. The last section concludes the paper.

[1] There has been a recent change in timing. Beginning on 01.03.10, the Indian market now opens at 9.00 am and closes at 4.00 pm. The last transaction is permitted up to 3.30 pm only.