FINANCIAL MARKETS INTEGRATION IN INDIA

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In the present study, we examine the issue of integration of financial markets in India. Given the growing movement of capital flows, particularly short-term capital, into the domestic financial markets, it is necessary to examine this issue so as to reap the positive benefits with having stable markets. For this purpose, the present study examines this issue in the post-1991 period by using monthly data on call money rates, 91 day Treasury Bill rates, Indian Rupee/US dollar exchange rates, and the London Inter Bank Offered Rate (LIBOR). By using a multiple co-integration approach, the study found that there is a strong integration of the domestic call money market with the LIBOR. Though, the study found that there is a long-term co-movement between domestic foreign exchange market and LIBOR, it is not robust. This may be due to frequent intervention by the Central Bank in the foreign exchange market. As the Government securities market in India is still in the developing stage, it was not found to be integrated with the international market. Policy measures (or reforms) are necessary to increase integration of financial markets. This would help in reducing the arbitrage advantage in some specific segment of the financial markets.

The degree of integration of financial markets around the world increased significantly during the late 1980s and 1990s. A key factor underlying this process has been the increased globalization of investment seeking higher rates of return and the opportunity to diversify risk internationally. At the same time, many countries have encouraged inflows of capital by dismantling restrictions, deregulating domestic financial markets, and improving their economic environment and prospects through the introduction of market-oriented reforms. This increase in the degree of

integration of world capital markets has been accompanied by a significant increase in private capital flows to developing countries.

Financial openness is often regarded as providing important potential benefits. Access to world capital markets expands investors' opportunities for portfolio diversification and provides a potential for achieving higher risk-adjusted rates of return. It also allows countries to borrow to smooth consumption in the face of adverse shocks, the potential growth and welfare gains resulting from such international risk sharing can be large (Obstfeld, 1994). It has also been argued that by increasing the rewards of good policies and the penalties for bad policies, free flow of capital across borders may induce countries to follow more disciplined macroeconomic policies that translate into greater macroeconomic stability. An increasingly common argument in favour of financial openness is that it may increase the depth and breadth of domestic financial markets and lead to an increase in financial intermediation process by lowering costs and "excessive" profits associated with monopolistic or cartelized markets, thereby lowering the cost of investment and improving resource allocation.

Increasing integration of financial markets also brings in certain risks. It has been recognized that the risk of volatility and abrupt reversals in capital flows in the context of highly open capital accounts may represent a significant cost. Concerns associated with such reversals were heightened by a series of recent financial crises – including the Mexican peso crisis of December 1994, the Asian crisis triggered by the collapse of the Thai Baht in July 1997, the Russia crisis of August 1998, and the collapse of the Brazilian Real in January 1999. Although misaligned fundamentals of some sort played a role in all of the above crises, they have called attention to the inherent instability of financial markets and the risks that cross-border financial transactions can pose for countries with relatively fragile financial systems and not so strong regulatory and supervision structures. Pro-cyclicality of capital flows may also increase macroeconomic instability, like favourable shocks may attract large amounts of capital inflows and encourage consumption and spending at levels that are unsustainable in the longer-term, forcing countries to over-adjust to adverse shocks as a result of abrupt capital reversals. The large capital inflows induced by financial openness can have undesirable macroeconomic effects, including rapid monetary expansion (due to the difficulty in managing and cost of pursuing aggressive sterilization policies), inflationary pressures (resulting from the effect of capital inflows on domestic spending), real exchange rate appreciation, and widening current account deficits. From this perspective, a key issue has been to identify the policy pre-requisites that may allow countries to exploit the gains, while minimizing the risks, associated with financial openness in an attempt to integrate with the world capital markets.

India, too, has taken a large number of measures in the process of financial liberalization during the 1990s. The overall package of structural reform in India has been designed to enhance the productivity and efficiency of the economy as a whole and thereby make the economy internationally competitive. These reforms include, *inter alia*, partial deregulation of interest rates; reduction of pre-emption of resources from banks through cash reserve ratio (CRR) and statutory liquidity ratio (SLR); issue of government securities at market related rates; increasing reliance on the indirect method of monetary control; participation of the same set of players in the alternative markets; move towards universal banking; development of secondary markets for several investments; repeal of foreign exchange regulation act (FERA); full convertibility of rupee on the current account; cross-border movement of capital and adoption of liberal exchange rate polices that assure flexible exchange rates; and investors' protection and curbing of speculative activities through wide ranging reforms in the capital market. An important objective of reform has been to develop the various segments of the financial markets into an integrated one, so that their inter-linkages can reduce arbitrage opportunities, help achieve a higher level of efficiency in market operation and increase the effectiveness of monetary policy in the economy.

After more than a decade of attempting to foster financial openness an important question remains: how much have these initiatives resulted in narrowing the inter-market divergences and achieved a reasonable degree of market integration both within domestic financial markets and between domestic and overseas markets? The present study tries to address this issue through an empirical exercise. Bhoi and Dhal (1998) tried to study this issue in the Indian context. With the help of monthly data upto 1997 the study found that though the domestic financial markets are integrated among themselves, they are not integrated with the world markets. Since 1997, particularly after the Asian crisis, the Indian financial markets have seen a huge inflow of foreign capital, which could change the open-economy macroeconomic situation in the country. At this juncture, it is necessary to re-examine this issue by using recent data on the returns in different financial markets.

The paper is structured as follows: Section I deals with certain conceptual issues relating to international financial integration. Section II gives a brief survey of the literature on international financial integration. Section III enunciates the econometric methodology used in this study. Section IV examines the results obtained from the empirical study done and Section V concludes with the policy implications.

I. CONCEPTUAL ISSUES

In this section we discuss some of the conceptual issues relating to the financial markets, and their integration. The section also discusses the issues relating to the measurement of the extent of integration.

A well-developed financial sector performs the following functions:

- It promotes overall savings of the economy by providing alternative instruments;

- It allocates resources efficiently among the sectors; and

- It provides an effective channel for the transmission of policy impulses provided the financial markets are *competitive, efficient & integrated*.

A typical *competitive* financial market has the following characteristics:

- There should be large numbers of buyers and sellers of the financial product;

- The price of the product is determined by the market forces of demand and supply;

- There should be a secondary market for the instrument;

- Turnover of instruments in both primary and secondary markets should be fairly large; and

- Agencies involved in the process of intermediation between buyers and sellers should provide intermediation services at a minimum spread.

A market is said to be *efficient* if the rate prevailing at any point of time contains all existing information in the market. If the realized rate contains all information, then the future rate cannot be appropriately predicted. In fact, the future rate reacts differently depending on the information that would be available at that point of time. In other words the future rates can adopt a path of random walk.

Apart from efficiency of individual markets, effective integration of financial markets depends on a few characteristics such as:

(a)   Financials markets are efficient and rates are market determined;

(b)   Across the board differences in returns on financial products are based on the risk and maturity profile of the instruments;

(c)   The rates of returns are related to a benchmark or a reference rate;

(d)   There is flow of resources from one segment of the market to the other and thereby the arbitrage opportunity is wiped out; and

(e)   The rates of various segments of the financial markets move in tandem.

In general terms, integration is the process by which segmented markets become open and unified so that participants enjoy the same unimpeded access. It can occur through the removal of domestic and international controls on trade in the asset, commodity or service under consideration, for example by implementing policies to deregulate markets, or it can occur simply by a reduction in the effectiveness of controls in markets, for example, by avoidance or non enforcement. In either case the key driving force for integration is the amalgamation of the private interests. The enduring popular representation of financial market integration is the equalization of the rates of return on similar financial assets. This has considerable intuitive appeal: as markets become more open and unified differences in rates of return should reflect only fundamental factors such as differences in asset quality, associated risk, liquidity and such factors.

The integration of financial markets thus implies an increase in capital flows and a tendency for the prices and returns on traded financial assets in different countries to equalize on a common-country basis. The convergence of returns is typically measured by interest parity conditions over a set of traded assets. Direct testing to determine the degree of international market integration can be carried out by examining the validity of various international parity conditions: purchasing power parity (PPP), covered interest parity (CIP), uncovered interest parity (UIP) and real interest parity (RIP). While the PPP condition is based on a comparison of the returns on identical goods, the other conditions are concerned with the returns on perfectly substitutable financial assets across countries.

The extent of market integration can also be tested indirectly by examining the degree of correlation between national savings and investments. The indirect test of international market integration is found in the work of Feldstein and Horioka (1980) and Feldstein (1983) who argue that in an internationally integrated financial market, potentially infinite capital flows eliminate differentials among nominal and real rates of return on identical assets, implying that a shortfall of saving in one country is unlikely to restrict its volume of investment therein. This is because perfect mobility of capital breaks the link between national saving and national investment and, therefore, a fall in private saving or a deficit in the current account in a country is unlikely to crowd out investment by raising the real cost of borrowing: rather, the country can borrow sufficient funds at the going world interest rate to cover the gap.

However, Frankel (1992) argues that there are several problems with the saving-investment criterion:

- The presence of cyclical movements may result in strong correlation between national saving and investment;

- National saving may become endogenous if governments respond to incipient current account imbalances with policies to change public (or private) saving in such a way as to reduce the imbalances;

- The correlation between saving and investment is reduced when large countries are excluded from the sample, implying that the world real interest rate will not be exogenous if the domestic country is large enough in world financial markets.

Given the above conceptual description regarding financial market integration, it can be concluded that increasing integration would lead to convergence in the returns in financial markets in the long-run. Further, the markets are expected to be more efficient with more integration. With this background, in this study we examine the issue of financial market integration in India. Before going onto the design of the empirical analysis, a brief review of the literature on international financial integration is done in Section II.

II. SURVEY OF LITERATURE

There are several reasons why policymakers and economists focus on financial integration. In the first place it is axiomatic that the macroeconomic policy mix depends crucially on the openness of the financial system (Fleming, 1962; Mundell, 1963). The more mobile capital is, the more the portfolio shifts and

the less flexible the exchange rate is, the more difficult it is for a country to set its interest rates independently of interest rates in the rest of the world. The degree of financial openness is an empirical question which needs to be resolved if policymakers are to know the structure of their economies and implement policies that will be effective in achieving their aims.

One implication of integration is that the market determines the price of the good or the asset in an efficient and equitable manner. The degree of integration would also indicate whether there are efficiency gains in the liberalization process. Financial integration also induces changes in the basic economic structure and in the operating environment for policy, business and households. This change can also often make it confusing and difficult to determine the behaviour of an economy in transition, which is very much necessary when it is considering liberalization of the capital account. Liberalization of the capital account has been impeded in most of the countries due to concerns that international financial integration will stimulate capital inflows, induce appreciation in the real exchange rate and thereby reduce international competitiveness (Dornbusch and Park, 1994).

Another policy aspect that arises from the analysis of financial markets is the increasing importance of foreign interest rates in the formation of domestic rates and foreign influence on the local economy in general. This in turn may change the synchronization of economic cycles between countries. Financial asset prices play a key role in the economy, since they affect marginal valuations and decisions and since they contain future expectations. As financial asset prices across countries converge, some shocks that were previously idiosyncratic should become common and the impulses they generate should be common to the local and foreign economies. The economy may respond to the same impulses but the generating mechanism of the impulses would change with internationalization. Financial integration, therefore, may imply greater integration of real economies. (Brouwer, 1999)

The extent of international market integration greatly affects the behaviour of exchange and interest rates across countries, which in turn have crucial implications for the degree to which the domestic monetary authorities can pursue independent monetary policies (Agenor, 2001). There is little dispute over the proposition that the more integrated the international markets for goods, capital and foreign exchange, the more limited is the scope for pursuing independent domestic monetary policies. For example, if goods and capital move around to eliminate the differential between prices and interest rates across countries, then the domestic monetary authorities will have no control over their real exchange and interest rates relative to those of other countries, limiting the impact of their

stabilization policies. Therefore, it is necessary to take full account of the possible repercussions of international market integration.

It is important to determine whether there has been a genuine increase in financial market integration. It has to be borne in mind that the same technological innovations that have paved the way for cross-border financial transactions have also increased the worldwide diffusion of information in real time. Accordingly, it could be the case that the main driving force behind the apparent increase in financial market linkages is the globalization of the news that affects financial prices instead of a higher degree of market integration. It is worth noting that the assessment of a hypothetical increase in financial market linkages will depend on the causes of the increase. In terms of welfare, for example, it should be clear that whereas a removal of barriers implies an increase in diversification opportunities -thus reducing the levels of risk that agents have to accept to obtain a given return- a greater globalization of the relevant information set would mean exactly the opposite. Ayuso and Blanco (1999) studied the stock market returns for the United States, Germany and Spain in the nineties and found that there has been an increase in the degree of financial integration among the markets considered. This has meant higher financial market efficiency and an improvement in the risk-and-return combinations available to investors.

Most of the empirical work done in this field has focused on OECD countries and East Asia. Kaminsky and Schmukler (2002) studied the dynamic aspects of international financial integration and suggested that equity prices tend to be more internationally connected than interest rates. Moosa and Bhatti (1997) provide conclusive empirical evidence on the high level of integration between goods and financial markets of Japan and six Asian countries by testing uncovered interest parity (UIP) and *ex ante* purchasing power parity (PPP).

The macroeconomic impact of international financial integration depends on the extent of domestic financial integration, that is to say the integration of domestic institutional interest rates such as deposit and loan interest rates with domestic money market rates which themselves turn on the regulatory and competitive structure of domestic financial markets. Bhoi and Dhal (1998) have attempted to empirically evaluate the extent of integration of India's financial markets in the post-liberalization period. According to them, there exists a fair degree of convergence of interest rates among the short-term markets-money, credit and gilt markets – but the capital market exhibits fairly isolated behaviour. Furthermore, they find that the integration of domestic and overseas financial markets is not robust.

According to Makin (1994), there is a consensus that UIP fails to provide any information about the degree of financial integration. This is based on concerns regarding time varying currency risk premia or irrational expectations about exchange movements. But UIP can be restated with the focus on the relationship between domestic and foreign interest rates, given expectations about movements in the exchange rate. In particular, if interest rates and exchange rates are non-stationary processes, then it could be interesting to see whether domestic and foreign interest rates have long-run co-movements. This would prove that both variables are co-integrated. In the next section we discuss the methodology that has been employed and the database used in this current study.

III. METHODOLOGY AND DATABASE

In the literature, one of the most extensively used methods used to examine the long-run relationship between two variables, is the co-integration approach. This issue of testing long-run relationships was addressed first by Engle and Granger (1987). But the most popular test for co-integration was developed by Johansen and Juselius (1990) that tests for the presence of multiple long-run relationships. In this study we use this co-integration approach to examine the integration of returns in both domestic and foreign markets. One of the pre-requisites for undertaking the co-integration framework is that the variables that are expected to have long-run relationship should be non-stationary at their levels and should be stationary at the same order (or difference).

The long-run relationship that we are examining here can be expressed as below

$$i_{t,k} = \alpha + \beta \, i^*_{t,k}$$

Where 'I' and 'i*' are the return (interest rates) in domestic and foreign markets respectively and the constant term is a wedge parameter between interest rates possibly caused by a risk premium or other asset differences. As specified earlier, first we check the stationarity properties of both the variables (in other words whether the returns are non-stationary at levels and stationary of same order) and then test whether they are co-integrated by the maximum likelihood technique outlined by Johansen and Juselius (1990).

Tests for non-stationarity

The first econometric step is to test if the series are non-stationary. The classical regression model requires that the dependent and independent variables in a regression be stationary and the errors have a zero mean and finite variance.

In the presence of non-stationary variables there might be what is called *spurious regression*. Hence, before fitting any reasonable model, one needs to examine the time series properties of the variables that are used in the model. This can be examined by using the augmented Dickey – Fuller (1979) (ADF) test. (The technical details for this method can be seen in any of the standard text books on time series econometrics).

There are some inherent problems with the ADF test, to overcome these we follow the sequential ADF test procedure, due to Dolado, Jenkinson and Sosvilla-Rivero (1990), is used to test for the presence of a unit root when the form of the data-generating process is unknown. Such a procedure is necessary as when we include the intercept and trend term in the ADF test, it reduces the degrees of freedom and the power of the test implying that we may conclude that a unit root is present when, in fact, this is not true. Further, additional regressors increase the absolute value of the critical value making it harder in decision making. On the other hand, inappropriately omitting the deterministic terms can cause the power of the test to go to zero. In the ADF test the null hypothesis would be the presence of unit root (in other words the variable is non-stationary at levels).

If the variables are non-stationary, we test for the possibility of a co-integrating relationship using the Johansen and Juselius (1990) methodology. Given a group of non-stationary series, we may be interested in determining whether the series are co-integrated, and if they are, in identifying the co-integrating (long-run equilibrium) relationships.

The results of the Johansen's co-integration test are sensitive to the lag length. The lag length is selected using the multivariate generalizations of the Akaike's Information Criterion (AIC) or Schwarz Bayesian Criterion (SBC). Johansen and Juselius (1990) provide the critical values based on two tests, namely maximum likelihood test and the trace test. Once we establish the presence of co-integration between two variables, we estimate the co-integrating relation. While the estimates of the co-integrating relation indicate the direction of attractions that maintain long-run stationarity in each system, however they offer no information about the adjustment speeds of the variables to deviations from their common stochastic trend in the short-run. To capture the speed of adjustment between two non-stationary variables, we estimate the error correction mechanism (ECM). The ECM restricts the long-run behaviour of the endogenous variables to converge to their co-integrating relationships while allowing for a wide range of short-run dynamics. The co-integration term is known as the *error correction term* since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments.

In this paper we deal with the integration of domestic financial markets with international markets as the issue of financial markets integration domestically was studied by Bhoi and Dhal (1998), where the study found that there is an increasing integration between the domestic financial markets. This paper uses 91-day Treasury bill rates (TB-91), call money rates (CMR) and Indian Rupee/US dollar exchange rate (ER) as a measure of returns in the domestic financial markets and attempts to find whether they are co-integrated with the London Inter-bank Offer Rate – LIBOR (used as the measure for the foreign interest rate). The study uses monthly data from January 1993 to December 2002. The main source of the data is the *Handbook of Statistics on Indian Economy, 2001* published by the Reserve Bank of India. In the next section we discuss the empirical results based on the multiple co-integration method.

IV. EMPIRICAL RESULTS

Before discussing the empirical results it may be interesting to note the relationships between domestic and foreign returns that are presented in the charts 1 and 2. It may be noted that though there is no visible relationship between TB-91 and CMR with LIBOR in the initial period, there seems to be some relationship from beginning of January 1999. This seems to specify that there are growing inter-linkages between domestic and foreign financial markets return particularly in the post-1999 period. The stationarity results, based on ADF test, are presented in tables 1 and 2. It may be noted that all the four variables, i.e., CMR, TB-91, ER and LIBOR were found to be non-stationary in their levels while found to be stationary in their first differences, thus satisfying the necessary condition for using multiple co-integration approach. The results based on multiple co-integration are presented in table 3.

Figure 1. Trends in TB-91 and LIBOR
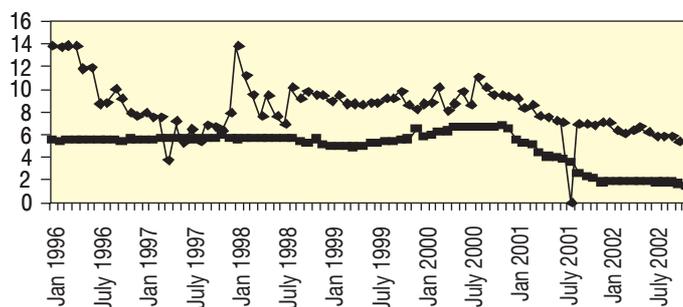
Figure 2. Trends in CMR and LIBOR
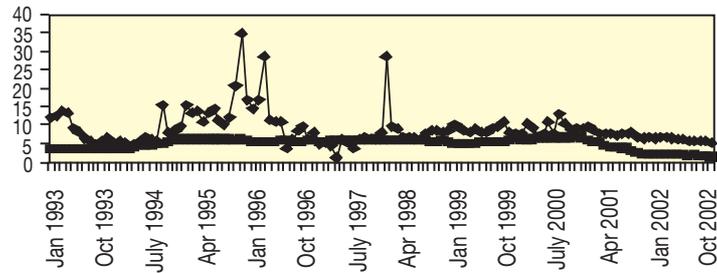
Table 1. Sequential ADF unit root tests at levels

Model	LIBOR	CMR	TB-91	ER
With trend & intercept	-1.39	-2.87	-2.994	-2.87
With intercept and no trend	-1.21	-2.79	-2.69	-0.272
With no intercept & no trend	-0.73	-1.27	-1.30	-1.52
RESULTS	Has a unit root	Has a unit root	Has a unit root	Has a unit root

Table 2. Sequential ADF unit root test on first differences

Model	ΔLIBOR	ΔCMR	ΔTB-91	ΔER
With trend and intercept	-3.85	-5.81	-6.91	-3.96
RESULTS	Does not have a unit root	Does not have a unit root	Does not have a unit root	Does not have a unit root

Critical values at 95 per cent level as follows.

With trend and intercept = - 3.4494

With intercept and no trend = -2.8868

With no trend and no intercept= -1.9428

Table 3. Cointegration between CMR and LIBOR

With no intercepts or trends

Maximum likelihood test

Null hypothesis	Alternative hypothesis	Test statistic	95 per cent critical value	90 per cent critical value
r = 0	r = 1	23.11	11.03	9.28
r <= 1	r = 2	0.34	4.16	3.04

Trace test

Null hypothesis	Alternative hypothesis	Test statistic	95 per cent critical value	90 per cent critical value
r = 0	r >= 1	23.45	12.36	10.25
r <= 1	r = 2	.335	4.16	3.04

Both the tests show that there is one co-integrating vector.

The normalized co-integrating equation is -1.0 CMR + 1.7683 LIBOR = ε_t

ECM = −.022548 CMR + .039782 LIBOR

For CMR

REGRESSOR	COEFF	P-VALUE
ΔCMR (-1)	-.10643	.244
ΔLIBOR (-1)	-1.6402	.247
ECM (-1)	19.2762	.000

For LIBOR

REGRESSOR	COEFF	P-VALUE
ΔCMR (-1)	-.00134	.826
ΔLIBOR (-1)	.15184	.110
ECM (-1)	.11163	.667

Co-integration test with an intercept and no trend

Maximum likelihood test

Null hypothesis	Alternative hypothesis	Test statistic	95 per cent critical value	90 per cent critical value
r = 0	r = 1	23.86	14.88	12.98
r <= 1	r = 2	.0223	8.07	6.5

Trace test

Null hypothesis	Alternative hypothesis	Test statistic	95 per cent critical value	90 per cent critical value
r = 0	r >= 1	23.88	17.86	15.75
r <= 1	r = 2	.0223	8.07	6.5

Both the tests show that one co-integrating vector exists.

The normalized co-integrating equation is -1.0 CMR + 1.271 LIBOR = ε_t

ECM = .023436 CMR -.029779 LIBOR

For CMR

REGRESSOR	COEFF	P-VALUE
Intercept	1.21	.007
ΔCMR (-1)	-.093	.317
ΔLIBOR (-1)	-1.47	.299
ECM (-1)	-19.56	.000

For LIBOR

REGRESSOR	COEFF	P-VALUE
Intercept	-.0068	.819
ΔCMR (-1)	-.0014	.822
ΔLIBOR (-1)	.151	.113
ECM (-1)	-.105	.687

Co-integration between TB-91 and LIBOR

With no intercepts or trends

Maximum likelihood test

Null hypothesis	Alternative hypothesis	Test statistic	95 per cent critical value	90 per cent critical value
r = 0	r = 1	6.18	11.03	9.28
r <= 1	r = 2	.499	4.16	3.04

Trace test

Null hypothesis	Alternative hypothesis	Test statistic	95 per cent critical value	90 per cent critical value
r = 0	r >= 1	6.68	12.36	10.25
r <= 1	r = 2	.499	4.16	3.04

Both the tests show that no co-integrating vector exists.

With an intercept and no trend

Maximum likelihood test

Null hypothesis	Alternative hypothesis	Test statistic	95 per cent critical value	90 per cent critical value
r = 0	r = 1	11.62	14.88	12.98
r <= 1	r = 2	.535	8.07	6.5

Trace test

Null hypothesis	Alternative hypothesis	Test statistic	95 per cent critical value	90 per cent critical value
r = 0	r >= 1	10.97	17.86	15.75
r <= 1	r = 2	.54	8.07	6.5

Co-integration between ER and LIBOR

With no intercepts or trends

Maximum likelihood test

Null hypothesis	Alternative hypothesis	Test statistic	95 per cent critical value	90 per cent critical value
r = 0	r = 1	10.65	11.03	9.28
r <= 1	r = 2	2.16	4.16	3.04

Trace test

Null hypothesis	Alternative hypothesis	Test statistic	95 per cent critical value	90 per cent critical value
r = 0	r >= 1	12.81	12.36	10.25
r <= 1	r = 2	2.16	4.16	3.04

Both the tests show that there is one co-integrating vector.

The normalized co-integrating equation is -1.0 ER + 16.056 LIBOR = ε_t

ECM = -.0021 ER + .0342 LIBOR

For ER

REGRESSOR	COEFF	P-VALUE
ΔER (-1)	.083	.350
ΔLIBOR (-1)	-.01	.952
ECM (-1)	1.51	.001

For LIBOR

REGRESSOR	COEFF	P-VALUE
ΔER (-1)	-.225	.653
ΔLIBOR (-1)	.152	.109
ECM (-1)	-.0013	.996

With an intercept and no trend

Maximum likelihood test

Null hypothesis	Alternative hypothesis	Test statistic	95 per cent critical value	90 per cent critical value
r = 0	r = 1	13.29	14.88	12.98
r <= 1	r = 2	4.58	8.07	6.5

Trace test

Null hypothesis	Alternative hypothesis	Test statistic	95 per cent critical value	90 per cent critical value
r = 0	r >= 1	15.84	17.86	15.75
r <= 1	r = 2	4.58	8.07	6.5

Both the tests show that one co-integrating vector exists.

The normalized co-integrating equation is $-1.0 \, ER + 2.063 \, LIBOR = \varepsilon_t$

ECM = .0154 ER + .0318 LIBOR

For ER

REGRESSOR	COEFF	P-VALUE
Intercept	-.347	.327
ΔER (-1)	.093	.305
ΔLIBOR (-1)	.114	.510
ECM (-1)	.62	.001

For LIBOR

REGRESSOR	COEFF	P-VALUE
Intercept	.554	.004
ΔER (-1)	.0024	.961
ΔLIBOR (-1)	.093	.319
ECM (-1)	-.75	.521

It may be noted that there is presence of long-run relationship only between CMR and LIBOR. But we found that the relationship between ER and LIBOR seems to be weak (at 10 per cent level of significance). There is no long-run relationship between TB-91 and LIBOR. These tests are sensitive to the lag-length chosen. Using AIC/SBC criteria we have chosen the number of lags as two. The results indicate that while the short-term money market is more integrated with the international financial market, there is no so robust integration between the domestic foreign exchange market and the foreign market. This may be due to the financial market reforms that are initiated in the money market. Also, the

foreign exchange market in India is still a managed market with regular (both direct and indirect) intervention by the Reserve Bank of India in its day to day business. In the case of the Treasury bill market, it is still in the developing stage.

In table 3 we have also presented the co-integrating relations and the error correcting terms. It may be noted that for any changes in the LIBOR market, the speed of adjustment in the CMR is much higher than in ER. It only indicates that the Indian short-term money market, compared with any other segment of domestic financial markets, is more integrated and adjusts comparatively fast to the changes in the international financial markets.

These empirical results must be interpreted with caution, bearing in mind problems associated with the testing techniques and the sample size. A small sample bias arises because the test statistics have asymptotic properties. With respect to this study, the possibility of structural breaks could arise because of the measures of financial deregulation implemented at different points in time, which this study could not consider and also it may be difficult to pinpoint.

V. CONCLUSIONS

As, in the Indian context, the call money rate and the exchange rate are found to be co-integrated with the LIBOR, there is some evidence that there exists a common stochastic trend between the domestic and foreign market returns. And the degree of integration seems to be growing over the period. It is desirable to strengthen the integration of financial markets to reap the positive benefits of it. But, since the degree of integration is dependent on policy and institutional infrastructure, the ongoing financial reform programme needs to be accelerated to further deepen the degree of convergence between the overseas and domestic markets. But even as efforts are intensified for deepening and broadening financial market segments and for developing a seamless and vibrant market continuum, a policy response to the transition should rely on multiple interventions. For this purpose a constant surveillance mechanism is needed to distinguish between the market reactions to fundamentals vis-à-vis transitory forces to ensure financial stability while reaping the positive benefits of free capital inflows.

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