artha

A NEWSLETTER OF THE FINANCE LAB

March 2015, Volume 2, Issue 10

INDIAN INSTITUTE OF MANAGEMENT CALCUTTA

INDIAN INSTITUTE OF MANAGEMENT CALCUTTA

FRTL
Financial Research & Trading Laboratory

Financial Research & Trading Laboratory

a₹tha

A NEWSLETTER OF THE FINANCE LAB

INDIAN INSTITUTE OF MANAGEMENT CALCUTTA

Indian Institute of Management Calcutta

Diamond Harbour Road,
Joka, Kolkata - 700104
West Bengal
033 2467 8300

Contents

Editorial

The Union Budget 2015 outlined some broad plans on financial market reforms including carving out of debt management from RBI. This issue of ***a₹tha*** covers two articles on Indian Bond Market and its management. Financial markets provide lifeline to the real sector. Hence, reforming financial market alone will not help our economy achieve target GDP of 8% or higher. The real sector, particularly manufacturing, needs to grow. The investment leadership for such growth should come from the Government. Hence, the Central Government should lead the way by investing massively in infrastructure sector.

The first article talks about 'hoarding of cash' by the corporate firms. The author argues that holding of such excess liquidity is an indication of lack of investment opportunities in near future and hence firms having excess cash are deemed to be ones facing lack of future growth opportunities.

The second article is on the separation of debt management from the central bank in India (RBI). The author looks on the debate in academic and policy circles as to which of these RBI functions are relevant to central banking.

The third article is Part II (findings) of the author's earlier research (Part I is released in July 2014, Volume 2, Issue 6). The main objective of this study was to investigate the long run relationship between spot gold and futures market. He finds that spot gold market is not at all integrated with the gold futures market and concludes that the pre-requisites for long-run relationship may not have been achieved by Indian gold futures market so far.

The fourth article, under the guest column, is on Corporate Bond Market. This article is a call to market participants to put effort on creating an enabling legal-regulatory framework which will improve the economics of bond market.

You may send your comments and feedback on this issue to ashok@iimcal.ac.in

Happy reading!

Ashok Banerjee

The Hoarders

Ashok Banerjee

Ashok Banerjee, Ph.D., is Professor, Finance and Control, Indian Institute of Management Calcutta (IIM-C). He is also the faculty in-charge of the Financial Research and Trading Lab at IIM-C. His primary research interests are in areas of Financial Time Series, News Analytics and Mergers & Acquisitions

Individuals or households 'hoard' cash to meet future committed expenditure or unforeseen events. The appetite for hoarding cash slows down the velocity of money. Creeping inflation, on the other hand, would erode cash values and hence hoarding cash pile could be at a risk. A reduction in interest rates also forces investors to move away from interest-bearing assets and to favour liquid assets. Traders 'hoard' commodities either to reap windfall gains or to guard against supply uncertainties. Hoarding for product price uncertainties is now almost a thing of the past as one can 'hedge' against such risks. Real estate agents 'hoard' property assets in case of rising property prices and cling on to those properties too long even when property prices fall in the hope of a turnaround. However, this hoarding tendency increases as the agents become more uncertain about future. There is also a tendency to 'hoard' too much at times. All forms of hoarding yield, in most of the cases, below-market returns.

Why does a corporate 'hoard' cash knowing fully well that such an action yields sub-optimal return? Any business entity would need to hold cash for essentially three reasons- *transaction need, precautionary need,* and *speculative opportunities.* The need of cash for first two reasons is pretty obvious and firms take refuge in the third reason to justify hoarding of cash. Firms argue that cash 'war chest' is necessary to exploit any opportunity offered by a good 'buy' candidate. The financial crisis of 2008 has also highlighted the virtues of liquidity. Firms with comfortable liquidity during the crisis could actually exploit the opportunities thrown up by cheap assets. It may be argued holding of such excess liquidity is an indication of lack of investment opportunities in near future.

Corporate finance defines 'excess cash' as the amount lying with a firm that cannot be invested in positive NPV (net present value) projects. Therefore, firms having excess cash are deemed to be ones facing lack of future growth opportunities. Managers of those firms would have tendencies to use the excess cash for diversifying into unrelated fields. Empirical evidence from the stock market

suggests that diversified firms suffer discount in the market. Hence, shareholders do not favour firms with excess cash and often demand such firms to distribute the cash to the shareholders by way of special dividend and/or share buyback. This agency problem gets amplified in case of firms with minimum or no promoter holding. One alternative in such a case is to minimize 'discretionary' cash with the management. If management do not possess excess cash, they cannot destroy it.

Corporate managers, on the other hand, argue on several occasions firms are forced to hold excess cash in view of uncertain external environment. Therefore, it is incorrect to blame them always for hoarding cash. Such corporate behaviour may be a result of adverse macroeconomic conditions rather than 'narrow' micro objectives. Firms hold onto cash to send signal to the government that lack of clarity on certain policies and poor overall economic scenario force them to wait for right opportunities.

How much cash do we hold?

During 2013-14, there were 48 companies (excluding financial institutions) in India each holding cash and cash equivalents of more than $500 million. The total excess cash during that year was to the tune of $ 92 billion ($ 76 billion in 2012-13. Number of companies having such excess cash has increased by almost 70% over the past five years. Interestingly, the increasing trend of hoarders is witnessed post-financial crisis. In other words, Indian firms are still waiting for positive signal from the government before committing major capital expenditure.

Table 1: Distribution of Cash Holding

Excess cash (in $)	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**
500M-1B	12	13	10	15	22
1B-5B	16	20	22	21	24
>5B	1	1	2	1	2
Total	**29**	**34**	**34**	**37**	**48**

This tendency to hold too much cash is not peculiar to Indian firms. The excess cash held by 3000 firms in the US (other than financial institutions) were more than $800 billion by the end of 2014. The top one percent of them account for more than fifty percent of excess cash (Table 2). The

correlation between excess cash holding and price-earning multiple is negative (-0.13) indicating clearly that market penalizes cash hoarders.

Table 2: Top Thirty Cash Hoarders in the US

COMPANY	EXCESS CASH	P/E
APPLE INC	74.35	16.74
MICROSOFT CORP	32.75	15.64
BERKSHIRE HATH-A	25.06	22.06
WAL-MART STORES	24.67	16.25
JOHNSON&JOHNSON	18.86	16.77
PFIZER INC	18.42	18.25
VERIZON COMMUNIC	18.12	14.46
IBM	18.01	9.67
PROCTER & GAMBLE	15.20	20.07
ORACLE CORP	15.13	17.67
GILEAD SCIENCES	15.01	13.66
GENERAL ELECTRIC	14.68	16.29
INTEL CORP	13.49	12.89
EXXON MOBIL CORP	13.44	11.20
COMCAST CORP-A	13.39	19.04
GOOGLE INC-A	13.37	27.87
CISCO SYSTEMS	11.90	15.62
AT&T INC	11.81	13.25
UNITEDHEALTH GRP	10.56	20.90
WALT DISNEY CO	10.49	23.14
COCA-COLA CO/THE	10.34	20.22
HOME DEPOT INC	10.09	23.99
PEPSICO INC	9.80	20.70
CVS HEALTH CORP	9.54	24.07
VISA INC-CLASS A	9.15	33.68
SCHLUMBERGER LTD	9.08	14.81
BOEING CO/THE	8.25	20.00
HEWLETT-PACKARD	8.13	9.98
UNITED TECH CORP	8.05	18.58

QUALCOMM INC	7.30	14.04
TOTAL	**478.44**	

Source: Bloomberg. Excess cash is in $billion

Excess Cash and Profitability

One can examine the relationship between excess cash and profitability. It is obvious that profitable forms would only indulge in hoarding cash. Firms with poor return on investment may not have the luxury of holding too much of cash. This 'problem of plenty' causes problems in terms of identifying profitable investment opportunities. Generally, managers have a 'perceived value' of share price of a firm. The decision of using the excess cash either for expansion or for dividend/share repurchases would depend on where the actual share price is vis-à-vis its perceived value. If actual price were less than the intrinsic value, managers would use excess cash to buy back shares and thereby increase share price. On the contrary if the actual share price is more than the intrinsic worth of a firm, managers would have incentive to use excess cash for expansion to 'fool' the market by perpetuating a false belief that shares are still underpriced.

Table 3: Excess Cash, Profitability and Stock Returns

Independent Variables	2009-10	2010-11	2011-12	2012-13	2013-14
ROA	0.469** (0.204)	0.768*** (0.236)	0.552* (0.319)	1.094*** (0.288)	0.876*** (0.233)
Operating Margin	-0.000152 (0.000107)	-0.000231 (0.000168)	-0.000334 (0.000237)	-0.000224 (0.000201)	-0.0000168 (0.000021)
Annual stock return	-0.00332 (0.0198)	-0.127* (0.0745)	0.0761 (0.112)	-0.170 (0.113)	-0.111 (0.0855)
Constant	14.07*** (3.962)	13.54*** (3.062)	15.33*** (4.490)	8.180** (3.949)	12.17*** (3.561)
R-squared	0.187	0.274	0.192	0.332	0.326

Standard errors in parentheses

**** p<0.01, ** p<0.05, * p<0.1*

In order to examine the relationship among three variables- excess cash, profitability and stock returns- a multivariate regression is used (Table 3). Three independent variables were selected to see their impact on excess cash. Results (Table 3) show that stock returns and excess cash are negatively related (though not significant in most cases). Positive and significant coefficients for ROA (return

on assets) show that firms with greater profitability hold excess cash. This is quite obvious. Why the coefficients for the operating margin are negative? Perhaps these imply that firms, with low operating margin, deploy excess cash to boost other income and hence overall profit. Firms with higher operating margin need not hoard cash to maximize overall profit. In other words, firms, which do not earn sufficient returns from main operating activities, would like to bolster their profitability through 'other income'. Obviously stock market will not be happy with usage of free cash. The coefficients of annual stock returns were largely negative implying a negative association between excess cash and stock returns.

Therefore, firms, which would like to maximize shareholder wealth in the long run, should not hold excess cash. It is prudent to distribute such cash to shareholders. These firms can always go back to them for funds whenever they need in future. The firms, in that way, would earn respect of their owners.

******

Separation of Debt Management and Central Banking in India: Principled Debate or Turf War?

Partha Ray

Partha Ray, Ph.D., is Professor, Economics, Indian Institute of Management Calcutta. Prior to joining Indian Institute of Management Calcutta, Prof. Ray, a career central banker, was the adviser to Executive Director, International Monetary Fund, Washington D.C. during 2007-2011.

The Reserve Bank of India (RBI) is not one of those Central Banks which attends only to devising and operationalising monetary policy. Like many central banks in emerging market economies it attends to various other functions of central banking. Illustratively, just to name a few, one may note that the RBI performs various developmental functions, effectively is the debt manager to the government, and maintains a detailed distribution system for coins and notes all over the major cities in India. Of late there has been some debate in the academic and policy circles as to which of these functions are germane to central banking. More importantly is there some conflict of interest between a subset of these functions? It is in this context that the role of the RBI as a monetary policy authority and its role as a debt manager attracted widespread attention.

In fact, there is an influential view that there could be conflicting objectives between RBI's pursuit of monetary policy instruments and public debt management – after all, while the objective of Debt management is minimization of cost of borrowing, monetary policy would aim at price stability and employment generation *via* tinkering with interest rates. The argument is succinctly summed up in a 2011 Working Group (of the Financial Sector Legislative Reforms Commission) report on debt management office (NIPFP, 2011), which said:

> "While monetary management has become increasingly market oriented, there are questions in regard to RBI's operations and functional independence. Given that RBI is a major investor in government securities, its market interventions through open market operations, liquidity management operations through cash reserve ratio (CRR) and liquidity adjustment facility (LAF) can be clouded by debt management objectives. There is a possibility of a renewed

fiscal-monetary nexus coming about through these channels. Additionally, RBI is also the banking regulator, and exercises control over investment proportions of banks in form of statutory liquidity ratio."[1]

The call for separation of debt management from monetary policy is, of course, blowing in the policy circles for some time. It may be useful to recall the broad sequence of policy pronouncements in this context. A 1997 RBI Working Group on "Separation of Debt Management from Monetary Management" perhaps for the first time recommended the separation of the two functions of monetary and debt managements and "establishment of a company under the Indian Companies Act to take over the debt management function" (RBI, Annual Report, 2001-02). The RBI Committee on Capital Account Convertibility (Chairman: S S Tarapore; 1997) also recommended, "Steps should be initiated to separate the debt management policy from monetary management and to this effect the Government should set up its own Office of Public Debt." Its subsequent version, viz., the Committee on Fuller Capital Account Convertibility (Chairman: S S Tarapore, 2006) went on say, "for an effective functional separation enabling more efficient debt management as also monetary management, the Office of Public Debt should be set up to function independently outside the RBI". Interestingly, the RBI Annual Report for 2005-06 noted, "In order to address the issues arising from these provisions of the FRBM Act, and to equip the Reserve Bank as well as market participants accordingly. . . the Reserve Bank constituted a new department named as Financial Markets Department (FMD) in July 2005 with a view to moving towards functional separation between debt management and monetary objectives." A similar recommendation was made by the Percy Mistry Committee Report on Mumbai: An International Financial Centre. More recently, the 2008 Raghuram Rajan Committee Report also argued for a change in the structure of public debt management in India.

The formal process of separation of these two functions started some time in 2007, when in his Budget speech, the Finance Minister announced a proposal to establish a debt management office to manage India's public debt. The then Finance Minister Chidambaram, in his Budget Speech 2006-07, said in concrete terms:

[1] NIPFP (2011): *Report of the Working Group on Debt Management Office* (Chairman: Govinda Rao), Delhi: NIPFP, available at https://macrofinance.nipfp.org.in/fslrc/documents/wgdmoreport.pdf

> "World over, debt management is distinct from monetary management. The establishment of a Debt Management Office (DMO) in the Government has been advocated for quite some time. The fiscal consolidation achieved so far has encouraged us to take the first step. Accordingly, I propose to set up an autonomous DMO and, in the first phase, a Middle Office will be set up to facilitate the transition to a full-fledged DMO."

There was some ambivalence in RBI's views. Perhaps the view in the RBI till about 2008 was that such a separation between debt management and monetary policy could come in longer run and is immediately unwarranted on practical grounds. This was reflected in a 2006 speech of RBI Deputy Governor Rakesh Mohan, when he noted:

> "In theory, separation between the two functions would perhaps enhance the efficiency in monetary policy formulation and debt management, but the debate in the Indian context needs to recognize certain key dynamics of the fiscal-monetary nexus. First, in India, the joint policy initiatives by the Government and the RBI have facilitated good co-ordination between public debt management and monetary policy formulation. …. Second, the RBI's experience in managing public debt over the years has equipped it with the requisite technical capacity of efficiently fulfilling the twin responsibilities of debt and monetary management in tune with requirements of the Government and market conditions. … With all of these changes taking place in the monetary fiscal environment in the near future, there will be great need for a continued high degree of coordination in debt management between RBI and the Government. In fact, in the U.S., even though debt management is formally done by the Treasury, the close co-operation that actually exists between the Federal Reserve Bank of New York and the Treasury is not very different in function from the relationship between the RBI and the Government in its debt management function (Mohan, 2006).[2]

More recently, RBI Deputy Governor H R Khan is a speech of August 2014 almost echoed Mohan's position and went on to conclude, "There is merit in continuance of present institutional arrangement. If at all, separation of debt management from central bank has to be effected, it should be preceded

[2] Mohan, Rakesh (2006): "Evolution of Central Banking in India", lecture delivered by the Deputy Governor, RBI at the seminar organized by the London School of Economics and the National Institute of Bank Management at Mumbai on January 24, 2006.

by well thought strategy focusing on perfect co-ordination among the Debt Management Office, the Ministry of Finance and the Reserve Bank of India".

In more recent past, the ghost of the separation of debt management from monetary has come to haunt the policy circles. While the Finance Minister Mr Arun Jaitley in his 2015-16 Budget Speech announced setting up of a Public Debt Management Agency (PDMA) which will bring both India's external borrowings and domestic debt under one roof, there are unconfirmed media reports of RBI developing some cold feet about the separation. In absence of concrete policy decisions, we are unable to decide whether it is turf war or RBI has started endorsing the stances of Deputy Governors Mohan or Khan about the practical difficulty of this separation!

******

Part II

Price Efficiency in Commodities Future Market – A case study for Gold Futures In India

Golaka C Nath[3] and Manoj Dalvi[4]

Dr. Golaka C Nath is a Senior Vice President at the Clearing Corporation of India Ltd. (CCIL). He has over 21 years of experience in the banking and financial sector, having previously worked with the National Stock Exchange of India Ltd. and Vijaya Bank. In the past, he has worked on a World Bank Project on "Developing Bond Market in South Asia". He has also provided secretarial service to the High Powered Committee on "Corporate Bonds and Securitization" appointed by the Ministry of Finance, Government of India.

This is Part II (findings) of the author's earlier research (Part I is released in July 2014, Volume 2, Issue 6).

6. Empirical Findings

The most popular test for determining whether or not a series is stationary is the (augmented) Dickey-Fuller test. Consider the AR (1) model $Y_t = \rho Y_{t-1} + v_t$. The process is stationary when $|\rho| < 1$, but, but when $|\rho| = 1$, it becomes the nonstationary random walk process $Y_t = Y_{t-1} + v_t$. Thus, one way to test for stationarity is to test H0: $\rho=1$ against the alternative H1: $\rho < 1$. Since we are testing the null hypothesis $\rho=1$ the test is known as a unit root test for stationarity. The test is generally carried out by subtracting y_{t-1} from both sides of the equation to obtain

$$Y_t - Y_{t-1} = \rho Y_{t-1} - Y_{t-1} + v_t$$

Rewriting the same as

$$\Delta y_t = (\rho-1)\, Y_{t-1} + v_t = \gamma Y_{t-1} + v_t$$

Where $\gamma = \rho-1$ and $\Delta yt = Y_t - Y_{t-1}$. Now we test null hypothesis H0: $\gamma = 0$ (nonstatinarity) against H1: $\gamma < 0$ (stationary). The differenced series of all four variables in our study have a non-zero mean but appear to wander around a constant amount. Thus we may choose an Augmented Dickey Fuller (ADF) test with a constant but no time trend for our data series. If Y_t is nonstationary, the usual *p*-

[3] gcnath@hotmail.com
[4] mdalvi@liu.edu

values and *t*-statistics do not apply. We need to find the test statistics tau (τ) statistics and its value must be compared to the specially generated critical values[5]. These critical values are different than the standard critical values used in most hypothesis tests. The ADF test adds lagged differences of y_t to the model. The lag structure has to be decided on the basis of the data in use. This is important as adding more lagged values may help in ensuring the residuals are uncorrelated. In our data, we have used one lagged difference term to eliminate autocorrelation in the residuals of our data series.

Table – 13: Critical Values (Davidson and MacKinnon)

Series Characteristics	Equation	1%	5%	10%
No Constant and No Trend	$\Delta y_t = \gamma Y_{t-1} + v_t$	-2.56	-1.94	-1.62
Constant but No Trend	$\Delta y_t = \alpha + \gamma Y_{t-1} + v_t$	-3.43	-2.86	-2.57
Constant and Trend	$\Delta y_t = \alpha + \gamma Y_{t-1} + \lambda t + v_t$	-3.96	-3.41	-3.13

The regression results for all four variables (level) with ADF test show that the tau (τ) statistics is higher than the critical values in all cases. Hence we fail to reject the null hypothesis that the series is non stationary.

Table – 14: Augmented Dickey-Fuller Unit Root Tests Results for Level Series

Parameter Estimates for MCX GOLD FUTURES						
Variable	DF	Estimate	Standard Error	t Value	Approx Pr > |t|	Critical Value @5%
Intercept	1	289.1781	177.1538	1.63	0.1057	
MCXF (lag)	1	-0.00401	0.009007	-0.45	0.6571	-2.86
DIFF (LAGMCXF)	1	0.0302	0.099	0.31	0.7609	

[5] Critical values are taken from R Davidson and J G MacKinnon (1993), Estimation and Inference in Econometrics, Oxford University Press.

Parameter Estimates for MCX GOLD SPOT						
Intercept	1	290.9134	175.6229	1.66	0.1007	
MCXSPOT(lag)	1	-0.00372	0.00894	-0.42	0.678	-2.86
DIFF (LAGMCXSPOT)	1	0.002989	0.0994	0.03	0.9761	
Parameter Estimates for CME Futures						
Intercept	1	25.9861	13.3162	1.95	0.0537	
CME(Lag)	1	-0.0172	0.0114	-1.5	0.1364	-2.86
DIFF(LAG CME)	1	0.1526	0.0969	1.57	0.1184	
Parameter Estimates for London Gold Spot						
Intercept	1	25.9337	13.2988	1.95	0.0539	
LAG(LONDON SPOT)	1	-0.0171	0.0114	-1.49	0.1381	-2.86
DIFF(LAGLONDONSPOT)	1	0.1503	0.097	1.55	0.1245	

We also estimated another alternate test for unit root for all four variables (level) with Phillips-Perron test and the regression results show that the tau (τ) statistics is higher than the critical values in all cases. Hence we fail to reject the null hypothesis that the series is nonstationary. The Phillips – Perron test statistics have the same asymptotic distribution as the corresponding ADF tests. The results also show that all four series are nonstationary. For all four series, the test statistics are greater than the corresponding critical values at 5% level of significance. For our results, "Zero Mean" is of primary importance as we have not included a trend in our regression.

Table – 15: Phillips-Perron Unit Root Test Results for Level Series					
Parameter Estimates for MCX GOLD FUTURES					
Type	Lags	Rho	Pr < Rho	Tau	Pr < Tau
Zero Mean	2	1.0215	0.9134	2.4573	0.9966

Single Mean	2	-0.4031	0.9324	-0.4237	0.9002
Trend	2	-7.867	0.5805	-2.0055	0.592
Parameter Estimates for MCX GOLD SPOT					
Type	Lags	Rho	Pr < Rho	Tau	Pr < Tau
Zero Mean	2	1.0281	0.9145	2.499	0.997
Single Mean	2	-0.3797	0.934	-0.4039	0.9036
Trend	2	-8.1809	0.5551	-2.0528	0.5661
Parameter Estimates for CME Futures					
Type	Lags	Rho	Pr < Rho	Tau	Pr < Tau
Zero Mean	2	0.4857	0.8006	1.0114	0.9173
Single Mean	2	-1.995	0.7763	-1.5156	0.5224
Trend	2	-2.3712	0.9583	-0.7368	0.9674
Parameter Estimates for London Gold Spot					
Type	Lags	Rho	Pr < Rho	Tau	Pr < Tau
Zero Mean	2	0.4892	0.8015	1.0162	0.9179
Single Mean	2	-1.9747	0.7788	-1.5015	0.5295
Trend	2	-2.4313	0.9563	-0.7523	0.9661

So far, we have considered only whether our four data series are stationary or nonstationary. It may be possible that the first difference of a nonstationary process is stationary. This concept is known as "order of intergration." A series, *y t*, that can be made stationary by taking the first difference is said to be integrated or order 1, denoted as I(1). In order to test whether the first difference, Δy_t, is stationary, we need to run a regression to regress $\Delta(\Delta y_t)$ on Δy_{t-1}. As the differenced series of our

variables appear to wander around zero mean, we will use the Dickey-Fuller test with no constant and no trend to test for stationarity of the differenced series.

Table – 16: Augmented Dickey-Fuller Unit Root Tests Results for Differenced Series						
Variable	DF	Estimate	Standard Error	t Value	Approx Pr > |t|	Critical Value @5%
Parameter Estimates for MCX GOLD FUTURES Differenced						
DIFF (LAGMCXF)	1	-0.8936	0.0975	-9.16	<.0001	-2.86
Parameter Estimates for MCX GOLD SPOT Differenced						
DIFF (LAGMCXSPOT)	1	-0.9152	0.0978	-9.36	<.0001	-2.86
Parameter Estimates for CME Futures Differenced						
DIFF(LAGCME)	1	-0.8162	0.0966	-8.45	<.0001	-2.86
Parameter Estimates for London Gold Spot Differenced						
DIFF(LAGLONDONSPOT)	1	-0.8186	0.0967	-8.46	<.0001	-2.86

We also tested the stationarity using Phillip-Perron Test for the differenced series. The results are placed below. Since we did not include an intercept or trend in our estimation, we will use the results from "Zero Mean". All four differenced series show that they are stationary as Phillips-Perron test strongly rejects the null hypothesis of nonstationarity (as all critical values are higher than the estimated Tau values), which leads us to conclude that four data series are stationary in their first difference.

Table – 17: Phillips-Perron Unit Root Test for Differenced Series					
Parameter Estimates for MCX GOLD FUTURES Differenced					
Type	Lags	Rho	Pr < Rho	Tau	Pr < Tau
Zero Mean	2	-94.7878	<.0001	-9.1712	<.0001

Single Mean	2	-101.502	0.001	-9.8667	<.0001
Trend	2	-101.507	0.0004	-9.8186	<.0001
Parameter Estimates for MCX GOLD SPOT Differenced					
Type	Lags	Rho	Pr < Rho	Tau	Pr < Tau
Zero Mean	2	-98.6759	<.0001	-9.3804	<.0001
Single Mean	2	-106.066	0.001	-10.1149	<.0001
Trend	2	-106.081	0.0004	-10.0652	<.0001
Parameter Estimates for CME Futures Differenced					
Type	Lags	Rho	Pr < Rho	Tau	Pr < Tau
Zero Mean	2	-85.3044	<.0001	-8.4405	<.0001
Single Mean	2	-87.7641	0.001	-8.6312	<.0001
Trend	2	-89.2835	0.0004	-8.7356	<.0001
Parameter Estimates for London Gold Spot Differenced					
Type	Lags	Rho	Pr < Rho	Tau	Pr < Tau
Zero Mean	2	-85.6283	<.0001	-8.4584	<.0001
Single Mean	2	-88.084	0.001	-8.6515	<.0001
Trend	2	-89.5602	0.0004	-8.7526	<.0001

As a general rule, nonstationary time-series variables should not be used in regression models to avoid the problem of spurious regression. Cointegration is an exception to the rule. There is an important case when $e_t = y_t - \beta_1 - \beta_2 x_t$ is a stationary I(0) process. In this case y_t and x_t are said to be cointegrated**.** Cointegration implies that y_t and x_t share similar stochastic trends, and, since the difference e_t is stationary, they never diverge too far from each other.

Two nonstationary time series are cointegrated if they tend to move together through time. For example, the Dickey-Fuller tests have led us to conclude that MCX SPOT Gold prices and the MCX Gold Futures prices rate series are both nonstationary. However, the plots of these series indicate that they tend to follow a similar path over time. If y_t and x_t are nonstationary I (1) variables, but if there is a linear combination of these variables that is a stationary I (0) process, then the two series are cointegrated. A natural linear combination to examine is the error $e_t = y_t - \beta_1 - \beta_2 x_t$. Since we cannot observe the error, we test the stationarity of the least squares residuals $\widehat{e_t} = y_t - b_1 - b_2 x_t$.

Testing for cointegration involves regressing one I (1) variable on another using least squares. Test the residuals for stationarity using the augmented Dickey-Fuller (ADF) test. The null hypothesis is that the residuals are nonstationary. Rejection of this leads to the conclusion that the residuals follow a stationary I(0) process and the series are cointegrated. The test for stationarity is based on the equation $\Delta\widehat{e_t} = \gamma\widehat{e_{t-1}} + v_t$. The regression has no constant term because the mean of the regression residuals is zero. We are basing this test upon estimated values of the residuals

Again, there are three sets of critical values depending on whether the residuals are derived from a regression equation with no constant term, a constant and no trend, or a constant and a trend. The critical values for the cointegration test are slightly different because the test is based upon estimated values. These critical values[6] are given in Table. This cointegration test is often referred to as the Engle-Granger test.

Table – 18: Critical Values (Hamilton)

Series Characteristics	Equation	1%	5%	10%
No Constant and No Trend	$y_t = \beta x_t + e_t$	-3.39	-2.76	-2.45
Constant but No Trend	$y_t = \beta_1 + \beta_2 x_t + e_t$	-3.96	-3.37	-3.07
Constant and Trend	$y_t = \beta_1 + \beta_2 x_t + \delta_t + e_t$	-3.98	-3.42	-3.13

In order to test cointegrating relationship between Spot Gold prices and MCX Futures Gold Prices, we regress one variable on other. Both the series are I(1) since they are found to be nonstationary, but their first differences are stationary using the regression equation $B_t = \beta_1 + \beta_2 F_t + e_t$. We estimate the regression and save the residuals for use in the ADF regression later. We test for stationarity in

[6] The critical values are taken from J Hamilton (1994), Time Series Analysis, Princeton University Press

the residuals. Estimate the model $\Delta\widehat{e_t} = \gamma\widehat{e_{t-1}} + \alpha_1\Delta\widehat{e_{t-1}} + v_t$, which is the augmented Dickey-Fuller regression with one lagged term to correct for autocorrelation. Since the residuals have a mean of zero, we did not want to include an intercept in the equation while testing for stationarity of residuals.

It may be noted that this is the augmented Dickey-Fuller version of the test with one lagged term, $\Delta\widehat{e_{t-1}}$, to correct for autocorrelation. The null hypothesis is that the residuals are nonstationary and thus series are not cointegrated. The alternative hypothesis is the residuals are stationary and hence the series are cointegrated.

Table – 19: Engle – Granger Cointegration Test Results

Parameter Estimates for MCX Futures on SPOT						
Variable	DF	Estimate	Standard Error	t Value	Approx Pr > |t|	Critical Value
ehat1	1	-0.2523	0.0892	-2.83	0.0056	-3.37
Diff(ehat1)	1	-0.4757	0.0954	-4.99	<.0001	
Parameter Estimates for CME Futures on London Spot						
ehat1	1	-0.604	0.1224	-4.94	<.0001	-3.37
Diff(ehat1)	1	-0.2542	0.0956	-2.66	0.0091	

Since there is a constant term in the cointegration regression $F_t = \beta_1 + \beta_2 S_t + e_t$, we use the 5% critical value from Table (Hamilton) above which is -3.37. Since the estimated statistics of -2.83[7] for the relationship between MCX Futures and Spot Gold prices is higher than critical value of -3.37, we fail to we reject the null hypothesis and conclude the MCX Gold Futures prices and Spot Gold prices are not cointegrated. The perceived relationship between these variables looks spurious. However, for the relationship between CME Futures and London Spot prices, we find that the test statistics is lower than the critical value at 5% level of significance. Hence, we reject the null hypothesis and conclude the CME Gold Futures prices and London Spot Gold prices are cointegrated. We further did a Phillips-Ouliaris test as an additional check to supplement our earlier results. The Phillips-

[7] The errors are nonstationary.

Ouliaris test is similar to augmented Dickey-Fuller test but with an adjustment to the DF statistics (Greene (2012)). The test results are given in the Table.

Table – 20: Phillips-Ouliaris Cointegration Test Results

MCX Futures on SPOT Gold			Critical
Lags	Rho	Tau	Value @5%
2	-51.8873	-5.8218	-3.37
CME Futures on London Spot Gold			
2	-89.9163	-8.4782	-3.37

Here our results show that the Phillips-Ouliaris cointegration test statistic has the same asymptotic distribution as Engle-Granger test statistic. The tau (τ) statistic is -5.8218 for Indian market and -8.4782 for global market and both are lower than the critical value of -3.37. Hence, we reject the null hypothesis and conclude that the series are cointegrated as per this Phillips-Ouliaris test.

Cointegration is a relationship between two nonstationary, I (1), variables. These variables tend to move together such that the residuals are I (0). In this section, we examine a dynamic relationship between I (0) variables, which embeds a cointegrating relationship, known as the short-run error correction model. We start with an autoregressive distributed lag (ARDL) model. Consider an ARDL (1,1) model, where Gold Futures prices is regressed on its first lag as well as the Spot Gold prices and its first lag.

$$B_t = \delta + \theta_1\beta_{t-1} + \delta_0 S_t + \delta_1 S_{t-1} + v_t$$

After some manipulation, this can be written as

$$\Delta B_t = (\theta_1 - 1)(B_{t-1} - \beta_1 - \beta_2 S_{t-1}) + \delta_0 \Delta S_t + v_t)$$

where the term in parentheses is called an error correction equation since it shows the deviation of B_{t-1} from its long term value, $\beta_1+\beta_2 S_{t-1}$. We use the nonlinear least squares to estimate the regression

$$\Delta B_t = \alpha(B_{t-1} - \beta_1 - \beta_2 S_{t-1}) + \delta_0 \Delta S_t + \delta_1 \Delta S_{t-1} + v_t)$$

where $\alpha = \theta_1 - 1$. We include the additional lag, ΔS_{t-1}, to ensure that the residuals are purged of all serial correlation effects.

Table – 21: Error Correction Model Estimates				
Error Correction Model for MCX Gold Futures				
Parameter	Estimate	Approx Std Error	Approximate 95% Confidence Limits	
alpha	-0.4863	0.0853	-0.6555	-0.3172
beta1	-58.9272	86.7079	-231	113.1
beta2	-0.9962	0.00436	-1.0049	-0.9876
delta0	0.9869	0.0237	0.9399	1.0338
delta1	0.0418	0.0236	-0.00494	0.0886
Error Correction Model for CME Gold Futures				
alpha	-0.8372	0.102	-1.0396	-0.6348
beta1	4.8252	0.767	3.3036	6.3468
beta2	-1.0022	0.000653	-1.0035	-1.0009
delta0	0.991	0.00477	0.9816	1.0005
delta1	0.00439	0.00477	-0.00508	0.0139

We generated the estimated residuals: $e\hat{}_t = (B_t - 58.9272 - 0.7766\ S_t)$ and its lag, first difference, and lagged difference for MCX Gold Futures and Spot prices and $e\hat{}_t = (Bt + 4.8252 - 1.0022\ S_t)$ for London Spot on CME Gold Futures prices. Finally, we estimated the augmented Dickey-Fuller regression, $\Delta\widehat{e_t} = \gamma\widehat{e_{t-1}} + \alpha_1\Delta\widehat{e_{t-1}} + v_t$, to test for a cointegrating relationship between Gold Futures and Spot prices in both Indian and global markets.

Table – 22: Cointegration Test after incorporating Error Correction Term					
Parameter Estimates for MCX Gold Futures on Spot					
Variable	DF	Estimate	Standard Error	t Value	Approx Pr > |t|
resid1	1	-0.1923	0.0903	-2.13	0.0355
dresid1	1	-0.4803	0.0929	-5.17	<.0001
Parameter Estimates London Spot on MCE Futures					
resid1	1	-0.5495	0.1166	-4.71	<.0001
dresid1	1	-0.2764	0.0946	-2.92	0.0043

Our results for Indian market show that the tau (τ) statistics of -2.13 > -3.37 while for CME futures, the tau (τ) statistics of -4.71 < -3.37. For Indian market we fail to reject the null Hypothesis and conclude that MCX Gold futures prices and Gold Spot prices are not cointegrated. However, we reject the null hypothesis for global market as we find that CME futures and London spot gold prices are cointegrated.

As our results show that MCX Gold futures prices and spot prices are not cointegrated, we will estimate a Vector Autoregressive Model (VAR) model using first difference. To estimate the VAR model, we regress the difference of each variable, ΔF_t and ΔS_t , on its own past value as well as the past value of the other variable in the system of equations. In our case, we include only one past lag of each variable and estimate a VAR (1) model.

Table – 23: VAR Regression Results					
Parameter Estimates for MCX Gold Futures					
Variable	DF	Estimate	Standard	t Value	Approx

			Error		Pr > |t|
Intercept	1	215.818	78.3088	2.76	0.0069
Diff(Lag Futures)	1	-0.1194	0.3846	-0.31	0.7569
Diff(Lag Spot)	1	0.154	0.3883	0.4	0.6925
Parameter Estimates for MCX Spot Gold Prices					
Intercept	1	226.056	77.2753	2.93	0.0042
Diff(Lag Futures)	1	0.4926	0.3796	1.3	0.1973
Diff(Lag Spot)	1	-0.4802	0.3832	-1.25	0.213
Parameter Estimates CME Gold Futures					
Intercept	1	7.2632	4.6303	1.57	0.1198
Diff(Lag Futures)	1	3.81	1.5763	2.42	0.0174
Diff(Lag Spot)	1	-3.652	1.5734	-2.32	0.0223
Parameter Estimates for London Gold Spot					
Intercept	1	7.1906	4.59	1.57	0.1203
Diff(Lag Futures)	1	4.3771	1.5626	2.8	0.0061
Diff(Lag Spot)	1	-4.2057	1.5597	-2.7	0.0082

The results very clearly show that MCX Futures and Spot Gold prices have no relationship while the same cannot be said for CME Futures prices and London Spot Gold prices.

Testing causality, in the Granger sense, also involves using F-tests to test whether lagged information on a variable Y provides any statistically significant information about a variable X in the presence of lagged X. If not, then "Y does not Granger-cause X."

There are many ways in which to implement a test of Granger causality. One particularly simple approach uses the autoregressive specification of a bivariate vector autoregression. Assuming a particular autoregressive lag length *p*, we estimated the following unrestricted equation by ordinary least squares (OLS):

$$x_t = c_1 + \sum_{i=1}^{p} \alpha_i x_{t-i} + \sum_{i=1}^{p} \beta_i y_{t-1} + v_t$$

$$H_0: \beta_1 = \beta_2 = \ldots = \beta_p = 0$$

And then we conducted an F-test of the null hypothesis by estimating the following restricted equation also by OLS:

$$x_t = c_1 + \sum_{i=1}^{p} \gamma_i x_{t-i} + \varepsilon_t$$

The next course of action is to compare their respective sum of squared residuals.

$$RSS_1 = \sum_{t=1}^{T} \hat{u}_t^2 \qquad RSS_0 = \sum_{t=1}^{T} \hat{e}_t^2$$

If the test statistic as defined in S1 below is greater than the specified critical value, then we reject the null hypothesis that Y does not Granger-cause X.

$$S_1 = \frac{(RSS_0 - RSS_1)/p}{RSS_1/(T-2p-1)} \sim F_{p,\, T-2p-1}$$

It is worth noting that with lagged dependent variables, as in Granger-causality regressions, the test is valid only asymptotically. An asymptotically equivalent test is given by

$$S_1 = \frac{T(RSS_0 - RSS_1)}{RSS_1} \sim \chi^2(p)$$

Another caveat is that Granger-causality tests are very sensitive to the choice of lag length and to the methods employed in dealing with any non-stationarity of the time series. We find that the past values of MCX Gold Futures do not help in predicting the spot prices (upto two lags) as p values are

insignificant. The same is also true for past values of Spot Gold prices do not help in predicting the futures prices (upto two lags) as p values were insignificant.

Table – 24: Bivariate Granger Causality Test Results (MCX)	
Test Results for Causality (MCX Futures predicting Spot)	
test1	p_val1
1.16888	0.31484
test2	p_val2
2.45236	0.29341
Test Results for Causality (MCX Spot predicting Futures)	
test1	p_val1
0.1133532	0.8929475
test2	p_val2
0.2378196	0.8878879

However, we find that the past values of CME Gold Futures help in predicting the spot prices (upto two lags) as p values are found to be significant. But the same is also mildly true for past values of London Spot Gold prices helping in predicting the futures prices (upto two lags) as p values were significant at 10% level.

Table – 25: Bivariate Granger Causality Test Results (CME)	
Test Results for Causality (CME Futures predicting Spot)	
test1	p_val1
4.2130196	0.0174567
test2	p_val2

8.8390804	0.0120398
IML Test Results for Causality (London Spot predicting CME Futures)	
test1	p_val1
2.8379418	0.0631783
test2	p_val2
5.9541132	0.0509426

While performing the Stock Watson test, we have estimated the test statistics while testing for Stock-Watson's Common Trends using Differencing Filter. In the results Table below, the first column is the null hypothesis that $\mathbf{y}_t$ has $m \leq k$ common trends; the second column is the alternative hypothesis that $\mathbf{y}_t$ has $s < m$ common trends; the third column contains the eigenvalues used for the test statistics; the fourth column contains the test statistics using AR (p) filtering of the data. The table shows the output with $p = 2$.

Table – 26: Testing for Stock-Watson's Common Trends Using Differencing Filter

Test Results for MCX Gold Futures and Spot					
H0: Rank=m	H1: Rank=s	Eigenvalue	Filter	5% Critical Value	Lag
1	0	0.99414	-0.63	-14.1	2
2	0	0.99592	-0.44	-8.8	
	1	0.83954	-17.17	-23.0	
Test Results for CME Gold Futures and Spot					
1	0	0.978192	-2.33	-14.10	2
2	0	0.977012	-2.46	-8.80	

	1	0.713523	-30.65	-23.00	

The test statistic for testing for 2 versus 1 common trends is less negative (–17.17) than the critical value (–23.0) for MCX Gold Futures market. Therefore, the test accepts the null hypothesis, which means that the series (MCX SPOT and MCX FUTURES) has no single common trend. However, for CME, the test statistic is -30.65 which is lower than the 5% critical value and hence the test rejects the null hypothesis, which means that the series (CME Gold Futures and London Spot) has a single common trend.

The data series (spot and futures prices) are found to be non-stationary in their respective levels though the difference series were found to be stationary using ADF test. Hence, we can also apply Johansen's cointegration test to find out long-term relationship between futures and spot market.

Table – 27: Johansen's Cointegration Rank Test Results

MCX Gold Futures and Spot				
r\k-r-s	2	1	Trace of I(1)	5% CV of I(1)
0	232.01	69.7251	9.6301	15.34
1		66.0449	0.2623	3.84
CME Gold Futures and London Spot				
0	231.503	60.2249	22.9693	15.34
1		60.0809	2.3137	3.84
5% CV I(2)	15.34	3.84		

Looking at the test results, we decide there is no more than 0 cointegrating vector when we test the same for MCX Futures and Spot Gold price series. But when we test for London Spot and CME futures, we find that there is more than 0 but not more than 1 cointegrating vector. The tests indicate that there is no short-term as well as long term relationship between MCX Gold Futures and Spot

Gold Market. The hypothesis of zero cointegrating vectors against the alternative of one or more cointegrating vectors is not rejected for MCX Futures and Spot Gold prices. Thus the results in table show that the Spot Gold market is not cointegrated with the Gold Futures market in India. Absence of a cointegrating relationship suggests that in the long-run, spot prices are not driven by activities in the futures markets and vice versa. However, the same cannot be said for MCE Gold Futures and London Spot Gold prices.

7. Concluding Observations

The main objective of this study was to investigate the long run relationship between spot gold and futures market. India is one of the emerging economies, which have witnessed significant development in the commodities markets during the recent periods due to the liberalization policy initiated by the government. Commodity futures trading has gained momentum in recent years. It is generally believed that due to liberalization policy and the consequent development of underlying markets, the spot and futures markets might have been well integrated. However, our study does not support this view. To this end conitegration techniques and vector error correction modelling was employed using monthly data form May'05 to Mar'14. After establishing the non stationarity and order of integration of each series, Engle - Granger test for cointegration, Stock-Watson test, Johansen's cointegration techniques were applied to investigate the long run relationship between exports and imports. The results indicate the existence of no cointegrating vector amongst Indian Spot Gold and MCX Gold Futures market. Rather, it finds that spot gold market is not at all integrated with the gold futures market. The study finds that London spot market and CME futures have a very strong long-term relationship. Hence we may conclude that the pre-requisites, which are required for long-run relationship may not have been achieved by Indian gold futures market so far.

****

GUEST COLUMN

Efforts to Develop India Bond Market: Are we barking up the wrong tree?

Deep N Mukherjee

Deep N Mukherjee is currently Director, Corporate Ratings with India Ratings & Research (Previously called Fitch Ratings India). He heads corporate ratings for Western India. He has over 11 years of experience in Risk Management and Credit Assessment. Prior to his current role, within Fitch he was in structured finance team. Prior to his organization he was with American Express where he was heading the Institutional Risk Management Team focusing on quantitative risk management. He is also a visiting faculty in finance with IIM Calcutta. He has done his graduation in engineering from IIT, Kharagpur (BTech, 1999) and has obtained his management degree from IIM Lucknow (PGDM 2002).

Efforts to develop the corporate bond market (CBM) in India have been going in right earnest at least since early 2000. And if the critical thought process behind these efforts is not relooked then the efforts may continue for another 15 odd years without any meaningful development in the Indian CBM. This would be in sharp divergence to the experience of successful development of India's equity markets and, to a reasonable extent, the development Government Securities market.

To be specific, a lot of efforts is placed in developing the bespoke 'Bond Currency Derivatives' (BCD) Nexus in Indian Markets. While BCD nexus is an essential condition for *enhancing* a CBM it is not sufficient for kick-starting bond market activity in a jurisdiction where the economics of bond market are not fully in place. For instance, it may be argued that not enough has been done to improve the supply side of the bond market i.e., issuers. For many corporates the decision of whether to borrow by means of a bond or a bank loan may be driven by unhealthy information asymmetry issues and not just by pure financial considerations such as cost of funds. Likewise, on the demand side, the current regulations tend to favour banks over other institutional investors such as mutual funds, pension funds and insurance companies.

The focus and the effort that has been dedicated in last 10 odd years in enabling BCD nexus could arguably have yielded better results if a portion of that effort was also dedicated in developing this fundamental demand –supply aspects of Indian bond market. The paper does not to undermine the arguments of the 'BCD Nexus' hypothesis (well it may be somewhat far-fetched to call it a theory

since empirical proof supporting the same may be difficult to come by). However, this paper is a call to market participants to put effort on creating an enabling legal-regulatory framework which will improve the economics of bond market.

The BCD Nexus

BCD nexus rightly assumes that financial markets such as government bond, corporate bond, interest rate and foreign currency have strong inter-relations. So the argument it forwards is that each of these markets cannot be developed as standalone markets. All these markets with their core offering as well as the derivatives based on such underlying assets would cause the other market to grow. Thus under this scheme of things, to develop bond markets in India , India also needs interest rate derivatives market , credit derivative markets and the like. These derivative products are expected to ease the ownership of a corporate bond. Indeed, there is some truth in it.

To illustrate, a corporate bond has three prominent risks. Firstly interest rate risk which will cause the bond price to rise or fall depending on whether systemic interest rate falls or rises. Secondly, credit risk, which is the risk of the corporate defaulting on its commitment to service the debt in a timely manner. Thirdly there is a liquidity risk. The spread of a corporate bond (which has a non-zero probability of default) over risk-free treasury/G-sec of comparable maturity is only partly explained by the pure credit risk premium. A very significant portion of the spread is explained by the liquidity premium. The liquidity premium tends to be higher for lower rated bonds; since lower rated bonds tend to be more illiquid than higher rated bonds.

Of course, there is a credit-spread risk there the market indicates that the bond's credit rating may be downgraded or overall there is higher level of risk aversion. Often differentiating between the liquidity premium and credit spread risk premium may be very difficult.

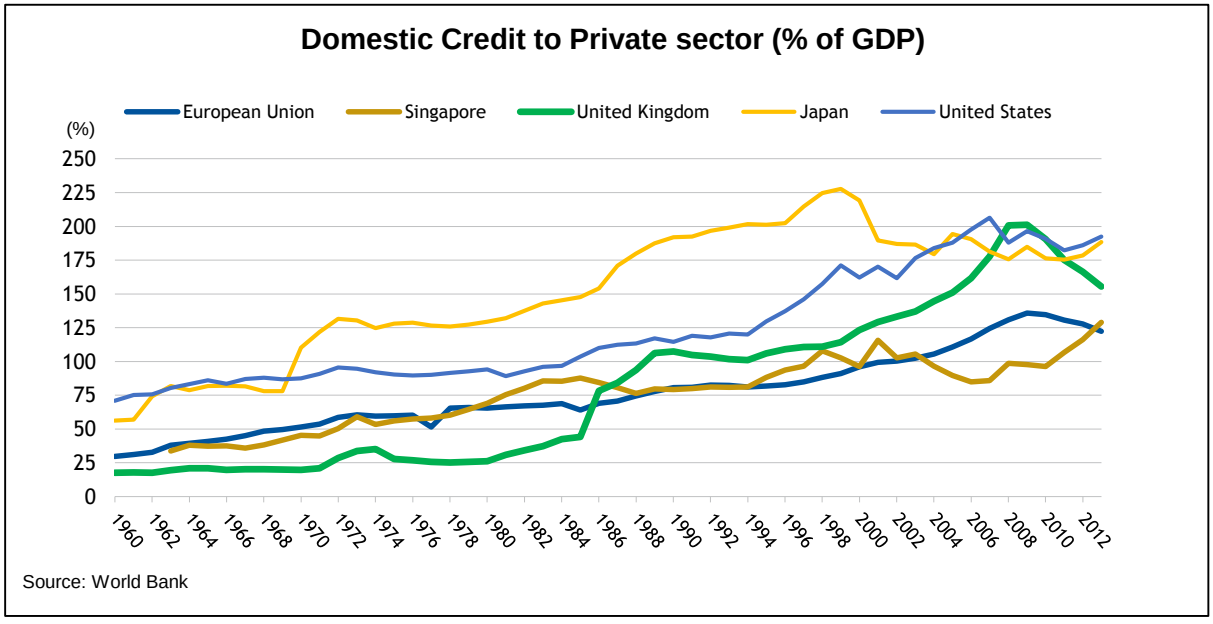
The investor, in an ideal world (exists only in text books), should be able to hedge in a cost effective fashion without any basis risk, the specific risk which they do not want to own. The investor will only keep those risks for which they have an understanding and have risk tolerance. Thus the corporate bond investor if uncomfortable with interest rate risk would use interest rate derivatives to hedge the same and hold onto the pure credit risk. Some investor may be uncomfortable with degree of credit risk may like to reduce the credit risk exposure by purchasing Credit Default Swaps (CDS). As per BCD nexus enthusiasts, this ability to hedge various types of risks inherent in a bond arguably will make the bond market more attractive to a whole lot of investors.

Of course, it goes on to assume a perfect world with highly efficient markets. The assumption is a remnant of the 'Pre-Lehman' world. Of course, limited consideration is given to the fact that even India's most successful market which is the equity market has significant liquidity issues for most stocks which are not part of the key benchmark indices. Thus given the liquidity issues, which are an outcome of a very shallow market, it is unlikely whether interest rate hedges or credit hedges can be purchased cost effectively. Not to mention other risks inherent in the corporate bond which may be hardly hedged anywhere in the world. While nothing grossly wrong with this elegant but may be somewhat over-simplistic line of thinking, however it overlooks certain fundamental aspects of bond issuances. It almost pre-supposes that the bond otherwise is appropriately priced based on risk based pricing and the corporate bond market has some critical mass.

Any Empirical Evidence That BCD has worked?

It is possible to envisage a scenario where the basic corporate bond market is reasonably developed and has a certain critical mass. Subsequently if such a bond market is allowed to interconnect with currency and derivatives market then the volume of bond trading may go up in the secondary market improving liquidity and facilitating market price discovery.

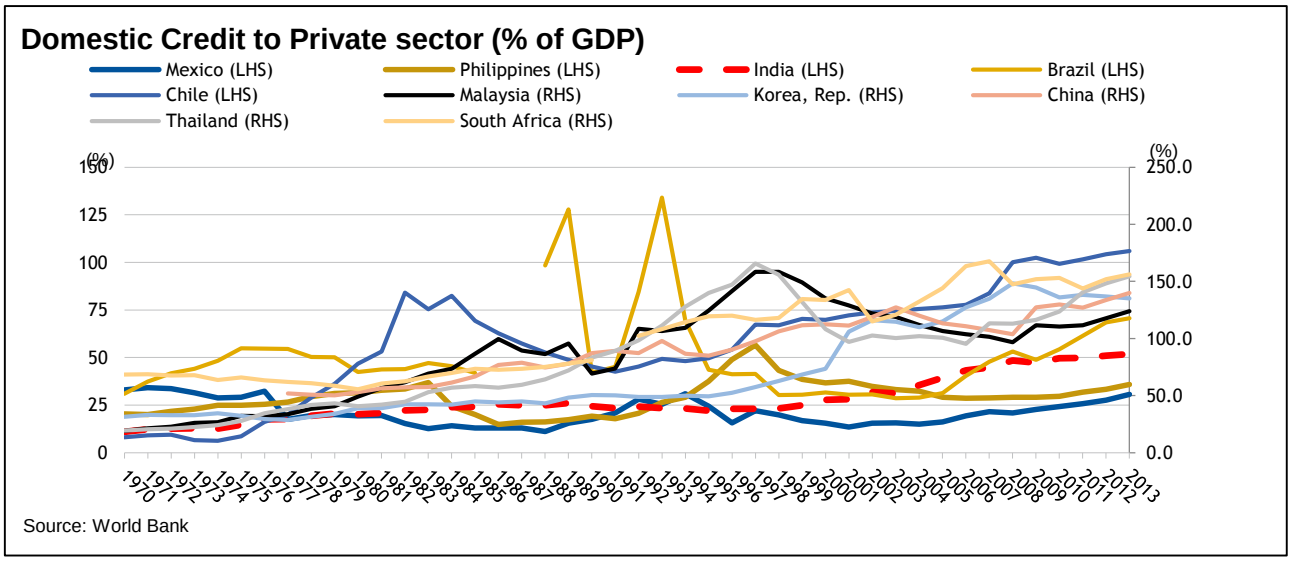
Jurisdictions such as US, UK, Japan and Singapore have all shown sharp growth in a variable namely private credit as a % of GDP (Source; World Bank) which is often taken as a proxy for development of bond market in cross country comparison [2].



(*#Domestic credit to private sector refers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment*.)

Private credit as a proportion of GDP has risen sharply in the period 1980 to 2000. Each of these markets had robust derivatives and currency markets in 1980s and subscribers to the BCD nexus hypothesis can reasonably attribute the robust growth of the respective bond markets to the interplay between currency and derivatives market.

The period post 70s observed the coming of age of the options/derivatives market. Around the same time, the foreign currency markets were also becoming more market driven as opposed to government/regulator driven. However it may be noted that even prior to that period the corporate bond markets for a lot of these jurisdictions were already at a higher level of development than the current level of Indian CBM (an estimated of 4% to 6% of nominal GDP).



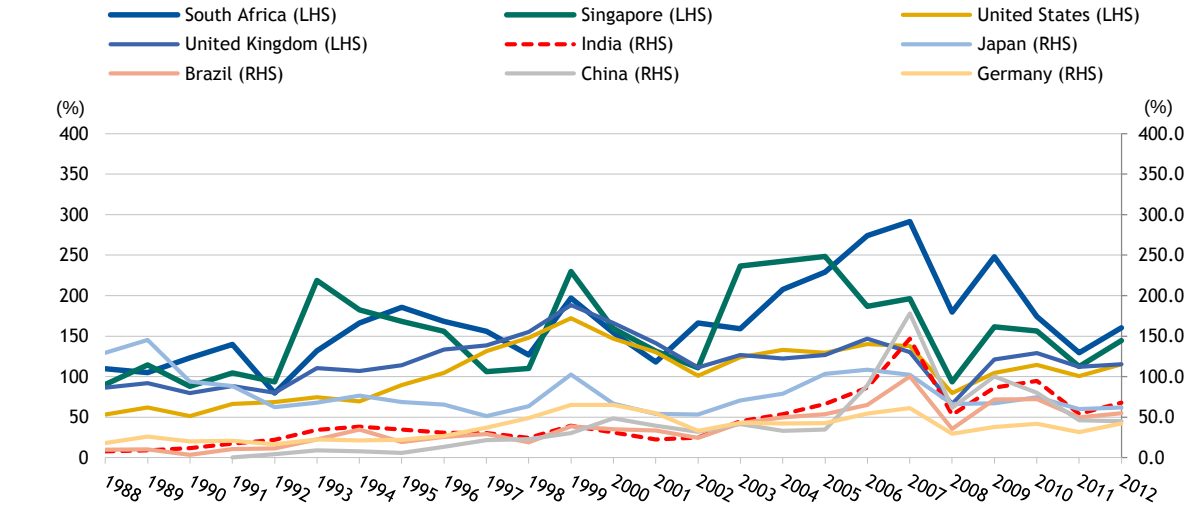
However, it may be worthwhile to note that the period from 1980 to 2008 also evidenced a global secular bull run in most asset classes supported by low interest rate and abundant global liquidity. So there may be more than one possible explanation for the surge in bond market of these nations other than just BCD Nexus.

Success of 'Other' Financial Markets in India

Post 1990, India had made significant efforts to improve the functioning and size of its financial markets. The most resounding success has possibly been the equity markets in India. The government

regulations have also been very supportive of equity market growth. The government's efforts to support equity market may be reflected in favourable tax treatment of long-term capital gains on equity investments as well as facilitating tax savings by investments in schemes such as ELSS.

Market Capitalization of Listed Companies (% of GDP)

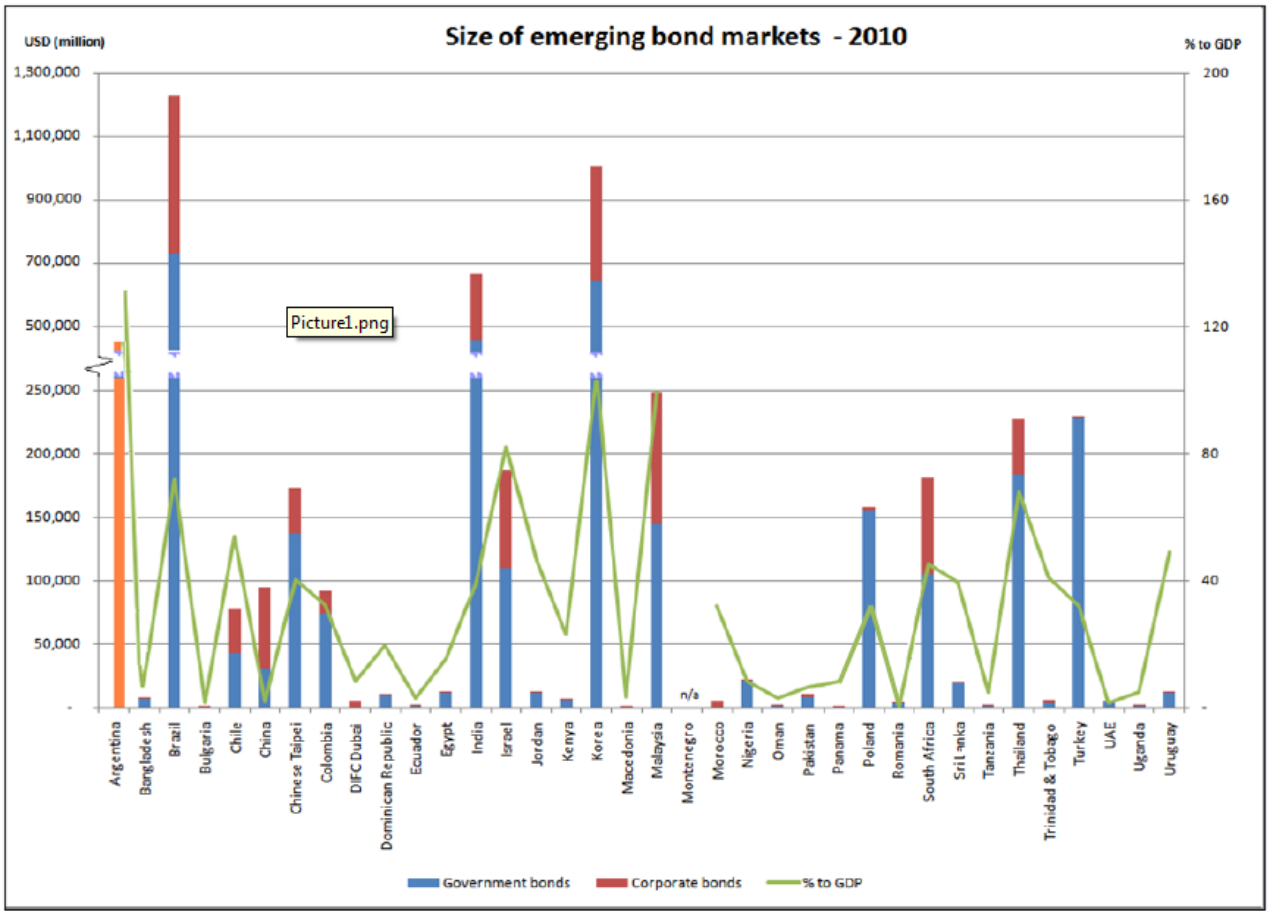


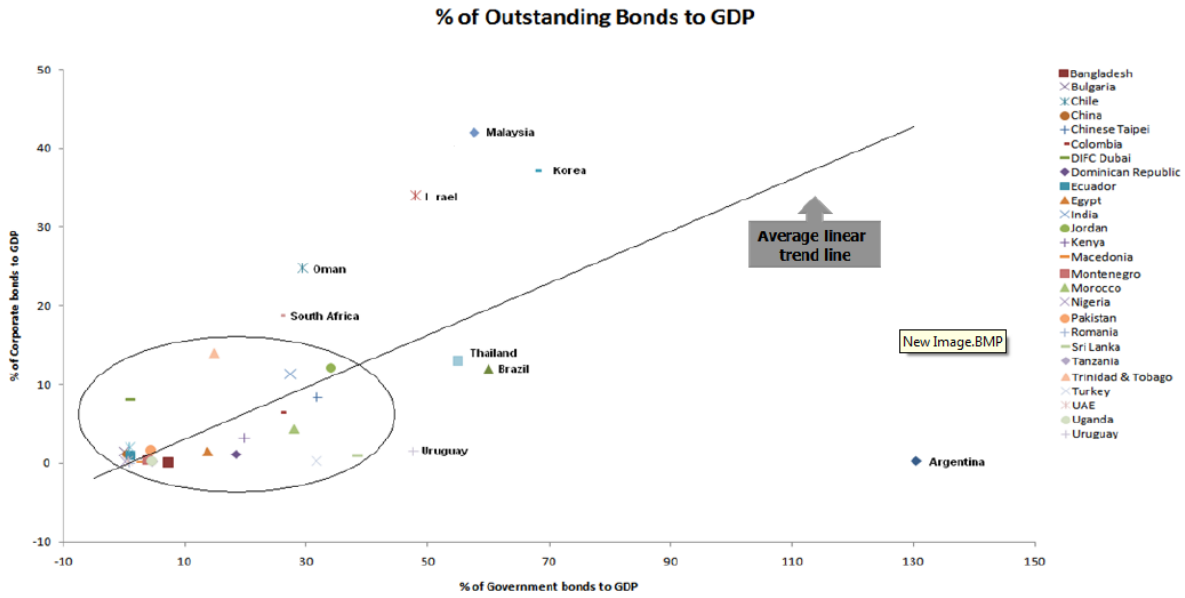
Source: World Bank

On a lighter note, the government's efforts towards bond markets in comparison to what it has done for equity markets may be termed as "step-parently" (to be gender neutral!).

The efforts of developing the government securities market have also been largely successful. In fact the long-term game plan has been to first develop the G-sec market and then the corporate bond markets.

As per a recent IOSCO study India remains in the top players in G-sec at least among the emerging markets, something that cannot be said about our bond markets. As the following two charts from the IOSCO study suggests that despite significant development in one type of fixed income product namely, government securities the corporate bond market has shown less than anticipated improvement.


Size of emerging bond markets - 2010
USD (million)
% to GDP
1,300,000
1,100,000
900,000
700,000
500,000
250,000
200,000
150,000
100,000
50,000
-
200
160
120
80
40
-
Picture1.png
n/a
Argentina
Bangladesh
Brazil
Bulgaria
Chile
China
Chinese Taipei
Colombia
DIFC Dubai
Dominican Republic
Ecuador
Egypt
India
Israel
Jordan
Kenya
Korea
Macedonia
Malaysia
Montenegro
Morocco
Nigeria
Oman
Pakistan
Panama
Poland
Romania
South Africa
Sri Lanka
Tanzania
Thailand
Trinidad & Tobago
Turkey
UAE
Uganda
Uruguay
Government bonds
Corporate bonds
% to GDP


% of Outstanding Bonds to GDP
% of Corporate bonds to GDP
% of Government bonds to GDP
50
40
30
20
10
0
-10
-10
10
30
50
70
90
110
130
150
Malaysia
Korea
Israel
Oman
South Africa
Thailand
Brazil
Uruguay
Argentina
Average linear trend line
New Image.BMP
Bangladesh
Bulgaria
Chile
China
Chinese Taipei
Colombia
DIFC Dubai
Dominican Republic
Ecuador
Egypt
India
Jordan
Kenya
Macedonia
Montenegro
Morocco
Nigeria
Pakistan
Romania
Sri Lanka
Tanzania
Trinidad & Tobago
Turkey
UAE
Uganda
Uruguay

India's Experience with Developing its Bond markets

The discussion is on not on what exactly (whether BCD nexus or secular bull run)developed the bond markets in major developed and emerging nations during the 1980s.Of greater importance is to note that these bond markets exhibited a level of development even prior to 1980s which India is unable to achieve even today[3]. Clearly, one may need to look at other factors existent in those markets in in the decade of 70s and 80s, which even the now the Indian markets may be lacking.

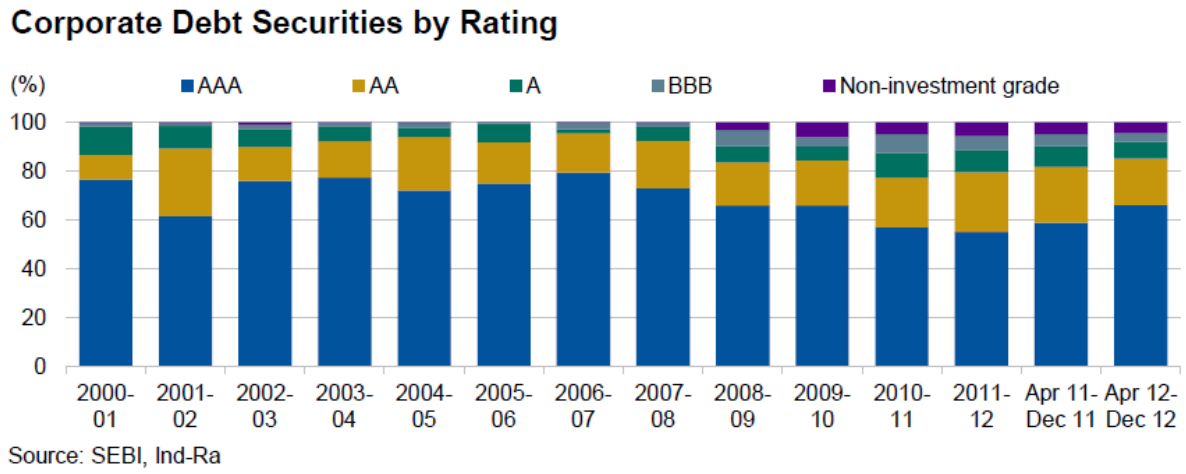
Efforts to revive the Bond Market: The watershed moment for efforts of development of Indian bond market was the publication of the report titled the High Level Expert Committee Report on Corporate Bonds and Securitization Chaired by Dr. R.H. Patil (Patil Committee report) on December 2005. It had 47 recommendations with 17 heads focused on the development of the primary bond market alone.

Post this comprehensive report and recommendations of the Dr. R.H. Patil Committee (Patil Committee), the reports of various committee/working groups have made incremental recommendations for CBM development in India, which provides the base for a significant body of recommendations. The recommendations tend to address four broad areas namely i) Legal aspects ii) Regulatory issues iii) Tax issues and iv) Market Micro structure.

Among the key recommendations implemented were those with respect to increasing the ease of debt issuance by corporate, enhancement of investor base, order matching trading system, reduction of withholding tax, launch of corporate repo, interest rate future and credit default swap.

However, arguably, the two most critical recommendations, namely the stamp duty rationalisation and improvement of bankruptcy regime, are yet to make any meaningful progress in last 10 years. These two measures may possibly have the largest positive impact in improving the bond market and they would do so by improving the economics of bond market.

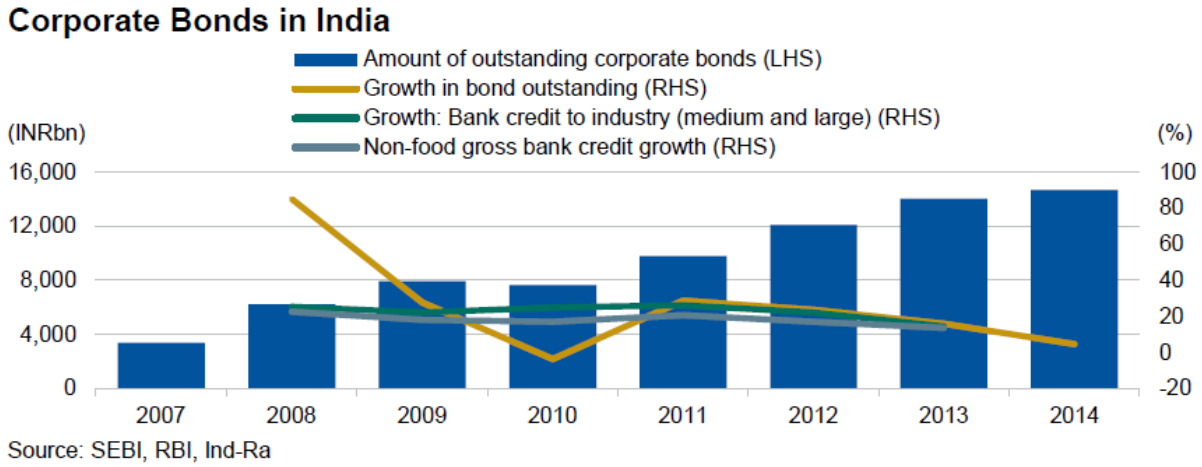
Current Status of Indian Bond Market: By some measure the depth of Indian CBM may have been higher in 200-02 than it may be currently. The market is clearly dominated by issuances of corporates in AAA and AA category rating. Within the AAA category most of the issuers would actually by government owned entities or quasi-sovereigns.



The issuances below A rated are more often than not privately placed and held by strategic investors in those corporates some of whom would also be an equity investor in the same company.

The above chart may imply that Indian investors do not have a high appetite for credit risk, thus they tend to avoid bonds which are rated at A category or below where the default rate is a non-zero number as opposed to AAA and AA rated securities. However, this is surprising because Indian investors have shown high appetite for everything from Ponzi Schemes to penny stocks to commodity notes to high-yield unrated bond issuances from real estate corporates. Surely an A or BBB rated bond is more secure than any of the above. So is there a case that lower rated bonds in India do not have too many takers because the investors do feel that they are rewarded enough? And does that imply that are banks under-pricing the risks of lower rated corporates or are there some bonafide reasons for the bank to price the loan lower than what the bond market would do for these type of corporates?

Disintermediation of Banks: Post 2010 there has been some improvement in the Indian bond market. But it was driven by the most common reason, across jurisdictions and time periods, of why bonds are issued-which is *dis-intermediation of banks*. The Reserve Bank of India (RBI) introduced base-rate in July 2010.



AAA rated issuers (often quasi-Sovereigns) and AA rated issuers who typically have negligible default rate tapped capital markets because they were able to get funding below the base rate of banks and banks could no longer lend them below their base rate.

This trend of disintermediation has continued till recently. Even now while the market driven interest rate has fallen in response to RBI rate cut, the base rate of most banks has not been adjusted downward. Thus one continues to see a flurry of bond issuances from high investment grade issuers. However, the depth of the bond market may not have improved since one does not come across to many, if any issuances, in A or BBB rating category.

Lessons Learnt Thus Far: The directional improvement in Indian bond market is more driven by regulations which improve the economics of bond market. The supply side of bond market benefitted from enabling regulations such as rationalising the issuance norm to increase the ease of issuance. The demand side benefitted from measures such as the launch of order matching systems, establishing primary bond database and the like.

Given the fact that corporate repo or CDS have failed to take off and usage of interest rate future to hedge interest rate risk in corporate bond holding is very limited it would be difficult to claim that these enablers of BCD Nexus has anything to do with the limited improvement the Indian Bond Market has shown.

Enhanced Focus on Improving the Economics of Bond Trade

While most of the recommendations by various committees and fora has been quite comprehensive, the author feels a lot more focus could have been given on strengthening and developing the building blocks of the bond market. Which is not to say they were not focussed upon, but possibly there was

a justifiable realisation that efforts like rationalising stamp duties across states or bringing bankruptcy laws at par with the developed world would take tremendous government support and a long time. Thus possibly the focus of efforts shifted to 'what-else' among the 'low-hanging fruit' can be done. It is during the pursuit of low-hanging fruit that some of the more implementable steps were possibly missed.

Cross Country Comparison: India's Weakness Stands Out

Country	Days required to enforce contract	Cost to enforce a contract (% of claim)	Years to resolve insolvency	Resolving insolvency: cost (% of estate)
Philippines	842	26.0	5.7	38.0
Indonesia	498	139.4	5.5	18.0
Vietnam	400	29.0	5.0	15.0
India	1420	39.6	4.3	9.0
Brazil	731	16.5	4.0	12.0
Turkey	420	24.9	3.3	15.0
Chile	480	28.6	3.2	15.0
Argentina	590	16.5	2.8	12.0
South Africa	600	33.2	2.0	18.0
France	390	17.4	1.9	9.0
Mexico	415	31.0	1.8	18.0
China	406	11.1	1.7	22.0
Korea	230	10.3	1.5	4.0
Malaysia	425	27.5	1.5	15.0
United States	370	14.4	1.5	7.0
Germany	394	14.4	1.2	8.0
United Kingdom	399	25.9	1.0	6.0
Singapore	150	25.8	0.8	1.0

Source: World Bank

Thus one may focus on a few of these measures, which may significantly improve the economics of the bond market.

Inability of Non-Bank Investor to Price Bond Competitively: The improvement in bankruptcy regime has always been identified as critical to bond market development. However, somewhat

surprisingly, the recommendation to allow all institutional investors uniform access to all recovery tools currently available is only heard in last three years. SARFAESI Act (Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest) arguably the best recovery tool available to Indian lenders was till recently available only to Banks, Housing Finance Companies (HFC) and only recently to NBFC (with assets above INR500 crore).

Access to SARFAESI tends to reduce the loss-given –default of the lender. Institutional investors such as Mutual Funds, Pensions Funds, Insurance companies who do not have access to SARFAESI would experience higher loss given default. While pricing a bond these non-bank entities may tend to price the bond higher than what a bank will price the loan for the same borrower.

This makes MF and other non-bank entities unattractive to corporate issuers whose credit rating is at A category or below. Thus MF tend to restrict themselves to high investment grade companies where the historical default rate is all but zero thus far in India.

Additionally, it may be unfair to expect regulators of pension funds and insurance funds to allow these entities to invest in debt securities lower than AA without giving them the access to recovery tools which are at par with the banks

Information Asymmetry Benefit to Bank Borrowers: For both bank loans and private placements, performance-related information is typically not made public. As of today, the debt servicing status of a listed borrower comes to the knowledge of investors rather irregularly, only from annual reports or irregularly from media reports.

In the event, the borrower is a listed entity, information about its default is likely to affect its stock price. Thus there is a strong motivation for the borrower to enter into debt transactions with lender counterparties which do not disclose this information. For weaker corporates, this may be an added motivation to continue with bank lending or private placements.

Steps taken to enhance information dissemination and thereby reduce information asymmetry with respect to such transactions may have positive implications for bond market development. They are:

- If a listed debt issuer knows the performance information would be shared actively with the market whether it borrows from bank or privately places a bond, then the borrower would focus on the most cost-effective source of raising debt.

- The prospect of prompt dissemination of negative performance information to market could improve payment discipline as well as make corporates rethink on debt-fuelled aggressive growth strategies in some cases.

Enhanced Focus on Improving the Economics of Bond Trade

Once the Indian bond market assumes some critical mass and depth the existing support structure created with the BCD nexus in mind may propel the market volumes to much higher level. However, for Indian Bond market to acquire that critical mass more focus needs to be paid at improving the economics of a bond trade. A lot more focus is required on this aspect and that too quickly. A lot of time has already been somewhat misallocated in launching corporate repos, CDS and interest rate derivatives with limited benefit to the Indian bond market.

Reference

Development of Corporate Bond Market in Emerging Markets published by Emerging Markets Committee of IOSCO in collaboration with World Bank Group, November 2011. (http://www.iosco.org/library/pubdocs/pdf/IOSCOPD360.pdf)

2) The development of Bond Markets around the world by Braun & Briones, 2006

3) The development of International Bond Market, Richard Benzie, Bank of International Settlements.

4) White paper on Reforming Corporate Bond Market in India: Scaling up resources from Private Sector for Infrastructure Financing, CII, March 2014

5) Corporate Bond Market in India: Issues and Challenges; Amarendra Acharya; Reserve Bank of India Occasional Papers; Vol. 32, No. 3, Winter 2011

6) NSE WORKING PAPER; Developing the Market for Corporate Bonds in India; Vikramaditya Khanna and Umakanth Varottil; March 2012

7) An Update on Recommendations for Developing the Indian Corporate Bond Market, City of London, March 2014

****