

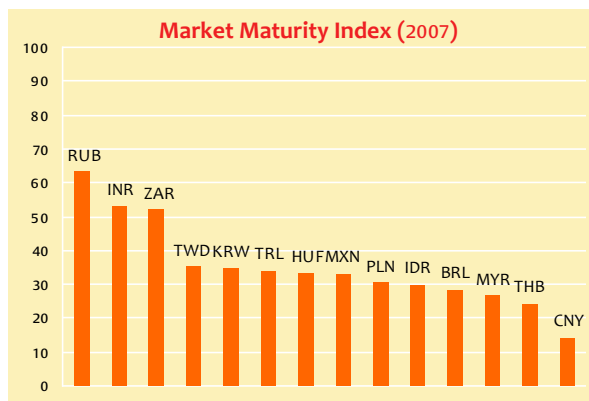
Coming of Age

A Comparative Study of Emerging FX Markets

EXECUTIVE SUMMARY

Russia, India and South Africa were the most mature of 14 emerging FX markets we studied, using data from the last (2007) BIS survey of central banks. They each scored more than 50 on the Market Maturity Index (MMI), suggesting they are more than halfway there, as compared to the fully mature markets, like the US.

We developed the MMI as a composite of the Relative Liquidity Index (which has historically been used to measure market maturity) and a Market Sophistication Index, which incorporates a range of other variables – cross border transaction volumes, domestic volumes traded by non-financial players (real sector players), volumes traded domestically by investment entities (hedge funds and the like), and volumes of derivatives transacted.



The MMI enables a more tailored way of looking at different elements of maturity and can assist central banks by providing direction to deregulation.

A key output of market maturity is ease of risk management, and we constructed a Risk

Management Index to measure this. While Russia and South Africa remained in the top 5 using this measure, India performed quite badly in 2007, ranking only 7th and quite far behind the leaders.

Of course, over the past couple of years, the Indian market has developed quite considerably, both in liquidity and sophistication. In parallel, its Risk Management Index has also improved. In 2008-09, when risk management was particularly difficult in all markets (including fully developed FX markets, like EUR/USD), India ranked 1st of all the emerging markets in the study.

South Africa, Taiwan and South Korea, all markets that had seemed reasonably mature in 2007, performed extremely poorly from a risk management perspective in 2009 when market conditions became more severe, suggesting that their original high MMI scores were probably not very stable. On the other hand, like India, four other markets – Brazil, Malaysia, Turkey and Poland – improved their Risk Management Index score quite substantially by 2009, suggesting that they, too, are likely more mature today.

Coming of Age

A Comparative Study of Emerging FX Markets

Background

The global FX market has emerged relatively unscathed by the “worst financial crisis since the Great Depression”. Other than a few cases of banks suffering losses as a result of settlement risk – when, for instance, one of the German Landesbanks delivered EUR (expecting USD in return) to Lehman Brothers on the morning it went bankrupt – there have been no defaults in the FX market.

Volatility has risen across the board, to be sure, as has the volatility of the volatility, which has made risk management much more difficult. Despite this, the FX markets, both those that are fully mature and, to a lesser extent, those that are emerging, have continued to do their job, enabling users to hedge risk and take positions at reasonable cost.

The Indian FX market

As a rule of thumb, the maturity of a FX market can be measured by the ratio of the daily volume traded to the country’s underlying foreign trade (imports plus exports). By that measure, India ranked third, behind Russia and South Africa, of 14 emerging markets we studied, using BIS data for transaction volumes and WTO data for trade volumes. [Since the BIS survey is conducted only once every three years, this data is from April 2007.] China and Brazil were far behind, with China ranking last. In fact, total CNY traded volumes were only about 25% of INR traded volumes.

Of course, the Chinese market has opened up considerably since then, and will likely have climbed a few notches. But the Indian market has been the real killer – the fastest-growing FX market of the 54 covered by the BIS. Daily volumes rose from \$ 34 billion in April 2007 to \$ 53 billion in April 2008, before falling to \$ 44 billion in April 2009. Despite this dramatic growth, there is still a lot of work to be done before the INR market could be considered highly liquid – we note that in 2007, its trade-adjusted liquidity was less than 40% of the US market.

Of course, and despite the continuing constraints on the capital account, the Indian market has matured in several other ways. There is increasing breadth of participation, and a substantial increase in the volume of options and other derivatives being traded; the offshore non-deliverable forwards (NDF) market has also grown in liquidity and depth. Most importantly, two-way movements in the price of the rupee are now a matter of course, confirming that our domestic FX market is certainly coming of age.

The Market Maturity Index (MMI)

Highly mature markets, like USD, EUR, GBP, CHF and JPY, all have excellent liquidity, and a broad array of different types of users. They enable pricing and transacting of long tenor (up to 30 years) products, and a wide variety of hedging instruments at a low cost.

Recognizing that a simple ratio of traded volumes to underlying trade is too simplistic to measure the highly complex markets of today, we developed a Market Maturity Index, which incorporates a range of other variables – cross border transaction volumes, domestic volumes traded by non-financial players (real sector players), volumes traded domestically by investment entities (hedge funds and the like), and volumes of derivatives transacted.

Methodology – Market Maturity Index (MMI)

The Market Maturity Index is composed of two separate indices. The first is the *Relative Liquidity index*, the classic tool used to estimate market maturity, which is calculated as the ratio of the total traded volume in a particular currency to the total underlying trade (imports plus exports) of the currency's country.

The second, which could be called a *Market Sophistication index*, is actually a combination of four sub-indices.

Globalization sub-index

This is calculated as the ratio of cross-border FX turnover to the total volume traded in that currency. It gives a measure of the ease with which on-shore parties can access the global market.

Real Sector sub-index

This is calculated as the total turnover undertaken by non-financial, non-bank entities – i.e., companies with trade and capital exposures – divided by the total volume of underlying trade (imports + exports). It provides a measure of both the ease with which companies can access the FX market, and, of course, the sophistication of such users.

Investor Activity sub-index

This is calculated as the ratio of non-dealer, non-real sector turnover to total domestic FX turnover. It is a proxy for capital mobility or portfolio flows as it captures FX hedging and trading activity of institutional investors, hedge funds, and non-dealing financial institutions with FX assets and liabilities.

Derivative Use sub-index

This is calculated as the total volume of FX forwards, options and currency swaps divided by the total domestic volume. This ratio measures a deeper layer of sophistication to the FX market. A well-developed OTC derivatives market allows participants considerably greater flexibility in managing their exposures.

All the indices and sub-indices are scaled to 100, using the US market as the benchmark.

The MMI consists of two indices, each of which has equal weight. The first is the relative liquidity index (the classic model), and the second is a market sophistication index, which is constructed by analyzing market volume and transaction data – how much is being transacted, who is transacting, what kinds of products are being used, etc. We believe the MMI enables a more tailored way of looking at different elements of maturity and can assist in providing direction to regulation. A detailed explanation of how the MMI is constructed is given in the Box on page 3.

We selected a sample of 14 currency markets for the study: 7 Asian emerging market currencies (China, India, Indonesia, Malaysia, South Korea, Taiwan and Thailand), and 7 other emerging market currencies (Brazil, Hungary, Mexico, Poland, Russia, South Africa and Turkey), using, again, BIS data from 2007.

Results and Analysis

The study shows that Russia was by far the most mature market in terms of its MMI. The Indian market, which came in second on the MMI, has the highest market sophistication index. The South African market, which was also highly liquid, came in third, with an MMI score very close to India's.

Taiwan, South Korea, Turkey, Hungary and Mexico were more or less at the same level of maturity. Each of them had very similar MMI scores, which were about 20 points behind India and South Africa. In general, most of the markets had similar rankings on both market liquidity and sophistication – however, South Korea and Turkey were somewhat conflicted. South Korea had a strong rating on liquidity (4th), but was much weaker (10th) on market sophistication. Conversely, Turkey had a very poor liquidity rating (13th) but an excellent market sophistication rank (2nd).

Poland, Indonesia and Brazil were close behind these, with Indonesia, surprisingly, showing the best market sophistication of the three. Malaysia and Thailand were down the scale, even though Thailand scored reasonably well on the relative liquidity index. China, unsurprisingly, was in the cellar.

A closer look at the components of the MMI provides a lot of more interesting information, and, as mentioned earlier, can provide signals for regulatory focus.

We note, for instance, that India (together with Turkey) had the highest possible score on the Derivatives Use sub-index*. Anecdotally, we know that 2007 was a year of huge derivative volumes, which has subsided substantially since. Thus, this component of India's MMI score will certainly be lower today.

More important, however, is the fact that India's score on the Investor Activity sub-index was extremely low – indeed it was the second lowest (to Thailand) of all 14 markets. While this activity has also most certainly picked up, this reading

* It may be significant that most countries in Asia, including those, like Thailand, which had a very low overall MMI, had high ratings on derivatives use. Contrariwise, there were countries, like Russia and South Africa, which had extremely high MMI scores, where derivatives use was relatively modest.

	MMI	Relative liquidity index	Market sophistication index	Globalization Sub-index	Real Sector Sub-index	Investor Activity Sub-index	Derivatives Use Sub-index
BRAZIL	28.06	9.48	46.64	36.94	9.13	100.00	40.47
CHINA	14.27	2.29	26.65	3.52	0.01	100.00	1.46
HUNGARY	33.35	18.38	48.32	100.00	12.04	65.06	16.19
INDIA	53.23	38.60	67.85	65.25	77.11	25.05	100.00
INDONESIA	29.74	7.21	52.26	58.68	17.19	43.66	89.52
MALAYSIA	26.95	5.40	48.5	63.20	5.57	83.49	41.75
MEXICO	32.86	14.90	50.83	100.00	9.16	81.61	12.55
POLAND	30.53	14.87	46.19	100.00	16.86	31.65	36.27
RUSSIA	63.43	66.49	60.38	95.23	91.34	47.35	7.59
SOUTH AFRICA	52.28	51.43	53.09	100.00	44.06	42.52	25.53
SOUTH KOREA	34.82	22.89	46.74	62.88	23.27	29.79	71.04
TAIWAN	35.41	16.40	54.42	89.42	24.85	40.88	62.53
THAILAND	24.03	10.27	37.78	63.93	14.73	26.75	45.73
TURKEY	33.82	6.60	61.04	100.00	2.34	41.82	100.00

indicates that RBI needs to do more to increase market access for the investment community.

Again, India's score on the Globalization sub-index is also relatively low – it ranks sixth from the bottom ahead only of China, Brazil, South Korea, Malaysia and Thailand. This may well have to do with the conservative approach of the banking regulator that limited the cross-border activity of domestic banks, which, given the trauma of the past couple of years, may not be such a bad thing.

On the flip side, India scored second highest (to Russia) on the Real Sector sub-index, confirming considerable anecdotal evidence that Indian companies are extremely savvy and pro-active in hedging their risk.

Interestingly, excepting in these two countries, and, to a smaller extent, South Africa, Taiwan and South Korea, the corporate sector appears to have very limited play in the FX market in most countries. In particular, countries like Mexico, Hungary, Poland and Turkey, which are very highly globalized but still score very low on the Real Sector sub-index, could likely see a strong increase in market maturity if the corporate sector is more effectively educated in risk management.

Correlating MMI with risk management

Of course, the ultimate test of maturity of a market is how well it enables users to manage their risk. In a well-developed market, volatility stays reasonably steady over the medium term, which makes managing risk relatively easy. In less mature markets, the volatility itself is very volatile – it jumps around, sometimes because of lack of liquidity and sometimes as a result of stop-start central bank intervention. This makes risk management much more difficult.

In trying to assess the effectiveness of different markets for risk management, it is clear that volatility alone does not tell the complete tale. For instance, while the average volatility of EUR/USD, a highly mature market, was 6.97% during

2006-07, there were less mature markets that had higher volatility – e.g., Hungary (11.5%), South Africa (15.3%), Brazil (11.8%) – and some where the volatility was lower – e.g., Taiwan (4%), Russia (3.5%), India (4.1%).

In most instances, currencies with lower volatility have greater capital controls and aggressive central banks – many of these were in Asia. Countries with higher volatility usually have more open capital accounts and/or thinner markets.

To more fully understand how volatility relates to market maturity we need to look beyond the simple volatility to its first derivative, the volatility of the volatility (V_2). This provides an assessment of how difficult it is to use a market for risk management – if the volatility jumps around too much (i.e., V_2 is very high), even buying options can result in opportunity losses. Clearly, the more mature a market, the lower will be the volatility of its volatility (V_2).

In 2007, the EUR/USD market had the lowest V_2 (of 17.8%). At the other end of the scale was the Indonesian rupiah at 38% and the Turkish lira at 40%. Note, again, that there is no correlation between volatility and V_2 . For instance, the Brazilian real had high volatility (11.8%) and a high V_2 (31%); on the other hand, the Indian rupee had low volatility (4.1%) but a high V_2 (33%). Thus, simply looking either at volatility or at V_2 doesn't give the complete picture.

To be able to use this volatility data meaningfully, we constructed a Risk Management Index incorporating both the volatility (representing the cost of using the market for risk management) and the volatility of the volatility

Methodology – Risk Management Index

We started with the assumption that the EUR/USD market is perfect from a risk management standpoint – the consistency of V_2 over the wide range of volatilities seen from 2007 (7%) to 2009 (17%) suggests that this is a reasonable assumption.

We constructed the Risk Management Index as follows:

Say, the V and V_2 are the volatility and volatility of volatility of a market, and E and E_2 are the volatility and volatility of the EUR/USD market; we first create a Volatility Index

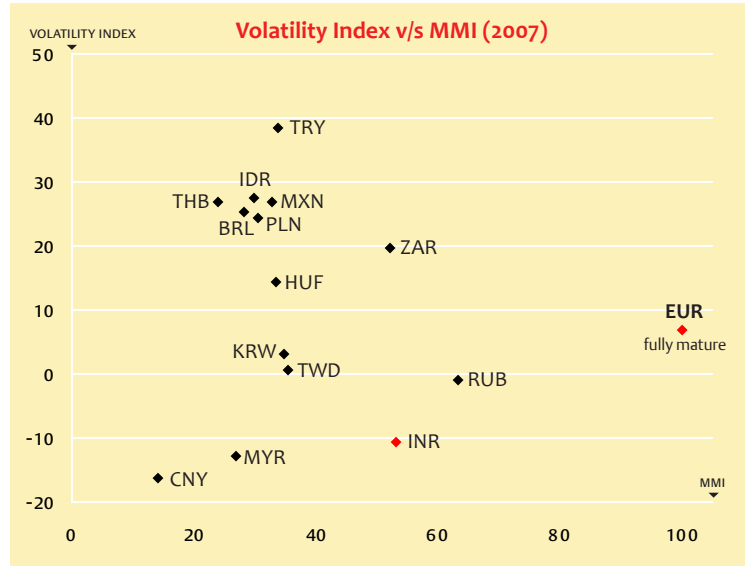
$$\text{If } V > E, \text{ Volatility Index} = V + (V_2 - E_2)$$

$$\text{If } V < E, \text{ Volatility Index} = V - (V_2 - E_2)$$

Thus, if a market has high volatility (relative to EUR), the difference between its V_2 and that of EUR is added to the volatility, pushing it farther away from EUR volatility; so, too, if a market has low volatility, the difference in V_2 , again, pushes it farther away from EUR volatility.

To create the Risk Management Index, we subtract E (EUR volatility) from the Volatility Index (bring the Risk Management Index of EUR to zero), and take the absolute value of this difference to be able to compare markets on both sides of the volatility spectrum.

(representing the difficulty of using that market). The index sets at zero for a fully mature market – we used EUR/USD – and the index value measures the difficulty of risk management.



We found that, from an ease of risk management perspective, the best markets (in 2007) were quite different from the ones deemed most mature according to the MMI. South Korea and Taiwan topped the list, with Hungary and Russia close behind. Risk management in the Indian market was relatively difficult – it ranked 7th of the 14 emerging markets, in terms of relative ease of risk management.

By 2009, with global volatility up sharply, risk management has become more difficult across the board. Interestingly, while the volatility of EUR/USD rose sharply (from 6.97% to 17.67%), V2 remained virtually unchanged (17.8% in 2007 and 18.02% in 2009), indicating a very high degree of stability in ease of risk management – a hallmark, in our view, of a successful and mature market.

Perhaps showing up the instability of less mature markets, we found that our sample of emerging markets showed considerable and diverse movements in their Risk Management Indices between 2007 and 2009. India improved its performance dramatically – its Risk Management Index came down substantially, from 17.71 to 9.98 – making it the best performer of the 14 emerging markets.

While there is clearly no strong correlation between the Risk Management Index and the MMI, they both assess the maturity of the market from different standpoints. Thus, we could conclude that markets that have shown an improvement in their respective Risk Management Index scores would also have matured on an MMI basis. This would suggest that, other than India, markets in Poland, Brazil, Malaysia, Thailand and Indonesia have all increased in maturity over the past two years. Rather surprisingly, South Africa and South Korea, both markets that had seemed reasonably mature in 2007, performed extremely poorly from a risk management perspective in 2009.

Conclusions

Russia, India and South Africa were the most mature FX markets in of 14 emerging markets we studied, according to the Market Maturity Index (MMI) we developed using data from the last (2007) BIS survey of central banks. China was in last place.

A key output of market maturity is ease of risk management and we constructed a Risk Management Index to measure this. There was relatively little correlation between this index and the MMI. While Russia and South Africa remained in the top 5 using this measure, India performed quite badly in 2007, ranking only 7th and quite far behind the leaders.

Risk Management Index					
	2007		2009		Change
	RANK	SCORE	RANK	SCORE	
BRAZIL	8	18.28	3	12.82	+++
CHINA	13	23.31	13	27.85	--
HUNGARY	3	7.44	7	18.06	---
INDIA	7	17.71	1	9.98	+++
INDONESIA	12	20.56	9	19.08	+
MALAYSIA	10	19.92	5	14.36	+++
MEXICO	9	19.78	10	21.97	-
POLAND	6	17.46	4	13.37	++
RUSSIA	4	7.97	2	11.62	--
SOUTH AFRICA	5	12.77	12	26.56	----
SOUTH KOREA	1	3.84	14	27.98	-----
TAIWAN	2	6.28	8	18.54	---
THAILAND	11	20.04	6	17.18	++
TURKEY	14	31.35	11	23.19	+++

Of course, as we are anecdotally aware, the Indian market has developed quite considerably since 2007, both in liquidity and sophistication. In parallel, its Risk Management Index has also improved. In 2008-09, when risk management has been particularly difficult in all markets (including the fully developed FX markets, like EUR/USD), India ranked 1st of all the emerging markets in the study.

South Africa, Taiwan and South Korea, all markets that had seemed reasonably mature in 2007, performed extremely poorly from a risk management perspective in 2009 when market conditions became more severe. On the other hand, four markets (other than India) – Brazil, Malaysia, Turkey and Poland – improved their Risk Management Index score quite substantially by 2009, suggesting that these markets would likely also have seen an improvement in their MMI.

MECKLAI FINANCIAL SERVICES LIMITED

www.mecklai.com | info@mecklai.com

MUMBAI : 022-22801120 AHMEDABAD : 079-26578906 | 8807 BANGALORE : 080-4151 3033, 4112 0135 | 36

CHENNAI : 044-42037433 | 34 | 28527581 DELHI : 011-41036100 | 07 | 08 HYDERABAD : 040-32936934 | 3293 6935

REGISTERED OFFICE : 101 MAHATMA GANDHI ROAD | FORT | MUMBAI 400 023 | INDIA

DISCLAIMER : The information and analysis contained in this document come from sources believed to be reliable; however, no representation or warranty, express or implied, is made as to the fairness, accuracy, completeness or correctness of this information. Nothing contained in this publication shall constitute an offer to sell/purchase or an invitation/ solicitation to do so for any currency, security, equity. Mecklai Financial Services Ltd. (MFSL) accepts no liability whatsoever for any loss, howsoever arising, from any use of this document, its contents or otherwise arising in connection