



The Issues with the Evaluation and Management of Market Risk for Emerging Markets

With Particular Attention to the Caribbean

Introduction

The management of risk presents considerable challenges for 'Emerging Markets' when compared to Developed Markets. There are many areas within the Global Economy where there are recognisable groupings of economies that are termed 'Emerging Markets'.

Examples range from large fast moving economies such as China, to smaller but sophisticated economies such as those of the Baltic States. The first use of the term 'Emerging Market' was from the World Bank during the mid 1980s and there has been significant investor activity within these markets throughout economic history.

There are several reasons why overcoming the risk management challenges, is an imperative. These include:

- The scale of many of these economies, offers great opportunity
- Rapidly increasing globalisation of the capital markets

The vanguard of financial institutions which successfully manage risk in the 'Emerging Markets' will define standards and benefit accordingly within their own market segments.

This paper is based upon the experience to date of implementing a modern risk management framework for a financial institution in the Caribbean. Whilst this is only one market, many of the challenges faced are the same as for any 'Emerging Market'.

The approach taken has been to identify a key challenge and outline a method of addressing the challenge. The list is as follows:

- Market Volume
- Diversity
- Pricing
- Yield Curve Construction
- History
- Analytical Research
- Derivatives
- Capability

Market Volume

'Emerging Markets' typically have low volumes or no volumes of trading activity in most financial instruments. This is because organizations require capital and raise this by issuing financial instruments, which are often guaranteed by government or quasi government institutions, which are placed with relatively few institutions and often held to maturity. The absence of an active secondary trading market means that market prices often do not exist and leads to a view that these instruments are illiquid and therefore 'high risk', which leads to further reluctance to trade.

This is the cause of many of the risk management challenges identified within this paper.

If trading activity within 'Emerging Markets' can be increased then most of the risk management challenges become more straightforward to solve. This has been viewed as a mainly insoluble problem; the thesis of this paper is that the application of best risk management practice, albeit in a difficult context, will promote investor confidence to the point where trading volumes increase, which in turn promotes the application of risk management.

Diversity

Closely coupled is the lack of diversity of instruments available within 'Emerging Markets'. Because the instruments issued are for specific capital raising purposes and often illiquid, there is limited demand for related instruments, which in turn means there is no market made in the related instruments. For example there are no quoted swap rates for the Trinidadian Dollar, because there is no active swaps market. This is because there is a low level of activity in the bond market and therefore little demand for swaps to hedge the cash flows from the bonds. Whilst understandable, this has the effect of further discouraging trading activity, because it is either too expensive or impossible to hedge tradable positions.

Clearly it is not possible to overcome the issue of a market simply not existing 'at a stroke', but it is possible to use proxy or theoretical pricing to build confidence that instruments may be valued and risk factors calculated. This in the long run, should increase willingness to invest, which will eventually increase market diversity. For example a method for providing a proxy for short end rates in the Trinidadian Dollar is to use a credit spread to US Dollar rates, which is calculated from a government issued short dated bond.

Pricing

To continue with this theme, the suggested way of enhancing investor confidence and ultimately trading volume is to use theoretical/proxy pricing methodologies wherever practically possible. This approach requires the following implementation to promote the desired effect:

- Publication of the prices by a recognized financial institution within the market
- Back testing of the theoretical prices against actual traded prices (where possible) to promote confidence in the calculated prices
- Use of the theoretically calculated prices to calculate risk measures such as Value at Risk (VaR), which is also back tested against actual profit and loss, again to promote pricing confidence

Pricing methodologies examples include:

- Use of a yield which is a credit spread to a Benchmark Bond
- Use of a yield which is a credit spread to an interpolated point on an established yield curve.
- Construction of a synthetic swap, which is built using the term structure of a bond and the yield curve assumed for the market

Yield Curve Construction

Yield curves are the basis for valuing and measuring risk for all cash based instruments. The discount curves, which are used to value any instrument into the future, are derived from the basic Par Yield Curve. In developed markets the yield curves are constructed in sections from actively traded instruments. So for example the points to one year may be constructed from quoted money market points, from one to two years from futures rates and thereafter swap rates.

In 'Emerging Markets' there are often no active market rates from which to construct a yield curve, which makes risk evaluation impossible. This follows the same 'vicious circle' pattern, stemming from the lack of liquidity within the markets and leading to difficulty in measuring and managing risk. Persisting with the use of theoretical approaches, which are re-calibrated by practical checks, the suggested approach is:

- Build the short end of the curve using proxy rates, taken from the developed market which most closely relates to the 'Emerging Market'. In the case of the Trinidadian Dollar, US Dollar money market rates were used. Calculate a credit spread to these rates, using best rated and shortest dated bond issues available.
- Construct the remainder of the par curve from bond issues, which a) have the best credit rating and b) are the most liquid
- For sparsely populated curves use splining interpolation methods to splice together different polynomials over different but overlapping terms to maturity
- Calculate risk measures (VaR etc...) using the yield curve and derived curves such as zeros and forward curves.
- Back test the results and re-calibrate based upon these back tests

Whilst curves constructed in this way, may initially produce some errors in the calculation of risk measures, they will become more accurate as they are re-calibrated and continuously improve investor confidence and trading volume.

History

The evaluation of risk for market risk is mainly based upon the log-normal distribution of prices. Usually the VaR is calculated using either volatilities or correlations derived from price history, or by historical simulation using price history. In 'Emerging Markets', because there are often no recognised prices, price histories do not exist, so the main conventional methodologies for calculating VaR cannot easily be used. This returns again to the issue of how to move this 'stalemate' situation forward. The suggested approach is:

- Start to maintain history of theoretically calculated prices and yield curve points
- If absolutely no history exists then seek prices that may be used as proxies from strongly related markets, that display similar volatility and correlative characteristics
- Use Monte Carlo simulation, incorporating calculation of Eigen values and Eigen vectors, as a mathematical alternative to historical simulation
- Use back testing to re-calibrate and build confidence

Analytical Research

For the techniques outlined above to have the effect of developing investor confidence, leading to increasing trading volumes, it is necessary to showcase the development through published research. This research should include the following:

- Yield curve construction with derived discount curves. This should cover the data sources and mathematical methodology
- Catalogue of theoretically priced instruments, with explanation of the methodologies used
- Calculation of risk measures (mainly VaR) for assumed portfolios
- Calculation of performance for assumed portfolios
- Results of back testing results including inferred statistical discrepancies
- Results of stress testing the assumed portfolios using specified stress tests e.g. yield curve shifts

Derivatives

Financial institutions are unlikely to be prepared to make markets in derivatives for 'Emerging Markets', until the beneficial effects of the abovementioned approaches are experienced. However as soon as trading volumes increase the need for derivatives and the further benefits brought through these instruments, will be experienced. A simple example of this is that an investor will be more prepared to invest in equities if that investor can hedge some of the exposure by the use of an option. The 'Emerging Market' will much more closely resemble a developed market when a full range of derivatives is available. This would clearly take time, but en route to this it is suggested that the following would promote the development of a derivatives market:

- Identification of key derivatives and definition of these on a scenario basis (i.e. fictitious)
- Development of pricing models for these scenario derivatives
- Incorporation of the scenario derivatives into the assumed portfolios
- Back testing of the scenario derivatives
- Limited market making of derivatives, based upon the results from the scenario research

Capability

The needs of 'Emerging Markets' are unlikely to be met by conventional risk frameworks, because of the need for extreme flexibility and agility. To be successful in establishing risk management as a way of life within any 'Emerging Market', on the way to that market becoming a 'Developed Market', it is asserted that the following must be in place within the risk management framework:

- Low cost of entry, but highly scalable from a functional and data volume perspective
- Highly flexible from a functional point of view, so that business functions may easily be added or modified
- Rules based approach to constructing functional paths within the framework
- Open data interfacing mechanisms
- Open and easy to use reporting from the framework
- Well developed channel for the publication of analytics