
**EVOLUTION OF PRICE RISK
MANAGEMENT
IN THE DEALING ROOM**

There used to be a time when any 'Bank' counterparty was considered a good name to trade with. It used to be that \$100,000 was the standard trading amount and brokerage fees were 1/8% of the principal amounts! That was not too long ago (25 years to be exact) but since then, the financial market in Singapore has undergone a period of rapid growth and change.

Today, a mere single large foreign exchange transaction would already exceed what was then the daily volume. Trading in interest rate instruments, both cash and futures, is also on a steep uptrend. As product complexities multiply and Treasury activities progress from simple straightforward spot foreign exchange and money market deals into more intricate derivatives and capital market products, the question must be asked whether the management of price risk has kept abreast of the latest financial innovations.

The traditional approach to price risk was to measure nominal position values. Position limits were set for all traders, along with a "stop loss" amount of capital put to risk. Traders were then expected to keep within their limits, and to square their positions and cease trading should these "stop loss" limits be triggered. This method worked well in the past, when plain vanilla products were the rule rather than exception. Their risk profiles were well documented based on historical data and more importantly, were understood by the risk managers. However, with the significant changes brought about by the development of new financial products - encompassing swaps and options etc, the traditional approach using nominal position limits has been found wanting as a tool for risk management.

As an illustration, the risk profile of a \$10 million option position that is out-of-the money and has 3 months to expiration clearly has a very different risk profile from the same nominal position expiring tomorrow. The inadequacy of the nominal position approach is further highlighted by its inability to aggregate risk across the multi-product multi-currency trading environment which is so common in today's dealing room.

The search for a better way to manage price risk has led to what may best be described as an "Earnings At Risk" approach. Simply put, this centres on the idea that any position in any financial instrument exposes the position taker to potential losses which can be estimated and expressed as a dollar value. The risk of loss is a function of both the sensitivity of the instrument as well as the expected price volatility.

For example, let us assume that there are three outstanding positions in the room:

- \$10 million \$/DM Spot at 1.6000,
- \$5 million 30-year US-Bond at 7.25%, and
- \$50 million 3-month \$/Yen Swap.

Under the 'Earnings At Risk' approach, an absolute dollar value to the price risk of each position can be calculated and then aggregated to reflect the risk across products and currencies. The dollar value of a position is derived by multiplying the position sensitivity by the expected volatility of the position. The position sensitivity of the portfolio is shown below:

- \$/DM : 1 percent movement = \$100,000,
- Bond : 1 basis point movement = \$7,194, and

- Swap : 1 percent foreign exchange, 1 basis point Yen, and
1 basis point US = \$4,080, \$1,230, and (\$1,220).

The next task for the risk manager would be to determine the volatility, or the size of the expected change in the market price over an estimated time frame to square the position. A two standard-deviation (SD) of volatility (95% confidence level) is used in this exercise:

- \$/DM : 2 SD = 1.64 percent
- Bond : 2 SD = 14 basis points, and
- Swap : 2 SD = 1.64 percent, 14 basis points, (16 basis points).

The earnings at risk for that instrument is then computed by multiplying its position sensitivity by its volatility:

• \$/DM	=	\$164,000
• Bond	=	\$100,716
• Swap	=	\$ 64,612
Total Portfolio	=	<u>\$329,328</u>

With the risks now quantified, the risk manager can then proceed to set more meaningful limits, perhaps as a function of branch capital or as a multiple of monthly earnings.

The concept of the “Earnings at Risk” approach is elegant in its simplicity, although it does require substantial operational resources. Firstly, volatility and sensitivity have to be determined for all products, and in addition, must be regularly reviewed and, if need be, revised. Secondly, the positions must be marked-to-market dynamically to compare actual losses to their “Earnings At Risk” limits. Also, the system must have the flexibility to

incorporate new products as these get added to the portfolio.

Even as the "Earnings At Risk" method is gaining increasing acceptance, the concept is undergoing further refinement involving the measurement of co-variances across the portfolio. This attempts to adjust the risk for the common effects on individual positions caused by changes in underlying instruments. For example, if the yield on the US-bond rises, there may be an underlying impact on both the \$/DM Spot and the \$/Yen Swap in our portfolio. These changes could be partially offsetting and thus the total risk in the portfolio may not be as high as the aggregate of the three individual positions. Co-variance effects are often estimated by using Monte Carlo (unbiased) simulations of price changes to determine the effects on the portfolio.

The concept of risk-adjusted return on capital has also taken on more significant meaning, as banks seek to minimise the usage of capital to support their trading activities. By understanding the price correlations of underlying markets and products, senior management will be able to allocate capital more efficiently to maximise its usage. Some banks have also attempted to identify the profit-and-loss distribution patterns of their trading activities. The objective is obviously to try to skew the distribution curve towards the profitable end of the spectrum.

What one also hopes to achieve from these exercises is the systematic quantification of the risk inherent in the bank's portfolio. Risk managers should then communicate to senior management the potential downside the portfolio could submit the bank to. Stress tests could be performed on the portfolio,

subjecting it to say extreme volatility levels or crisis scenarios. With the results obtained from such analyses, senior management should be able to then endorse or adjust the level of trading risk that the portfolio is taking on. The various levels of management would thus be able to satisfy themselves as to the amount of risk in the portfolio.

As dealing rooms of the 90's expand their trading to a larger number and types of products, simple measurements of risk using nominal values will no longer be adequate. Price risk management is rapidly evolving into an integral part of a modern dealing room. The market is upping the ante to stay in the race to be competitive. To avoid nasty and costly surprises, price risk management techniques must be commensurate to the complexity and diversity of a dealing room's activities.