

Getting the measure of value at risk

VaR can be invaluable in calculating market risk and has uses for companies from all sectors. By Margaret Woods, Nottingham University Business School.

All investors worry about downside risk. The idea of being able to assess the scale of the likely loss at a defined level of probability therefore has an intuitive appeal. This is where Value at Risk (VaR) comes in. It is becoming the most widely used measure of financial risk and is also enshrined in both financial and accounting regulations.

VaR was born out of a desire to focus on downside risks. According to industry legend, the chairman of JP Morgan would ask his staff to produce a daily one-page report showing the potential losses and risks that might be incurred from the bank's activities over the following 24 hours. The requirement was for a measure of the monetary value of aggregate risk across all the portfolios and across the whole institution: this was Value at Risk.

The value of an investment portfolio depends on the market prices of the components – equities, bonds, commodities or financial instruments – which vary with changes in interest and exchange rates. VaR is therefore commonly described as a measure of market risk because it is a monetary estimate of the likely fall in the portfolio value that would result from movements in the market prices of financial assets/liabilities. Its calculation expresses the likelihood of loss in terms of a specified level of probability assuming a given holding period or time horizon during which the portfolio is unchanged.

For example, a company may own an investment portfolio on which the risk manager estimates the VaR to be £8 million, at a 95 per cent confidence level, with a 10-day holding period. This means that, if no investments are bought or sold over a 10-day period, there is a five per cent chance of the portfolio value falling by £8 million. Over the course of a 250-day trading year, there will be 12.5 occasions (250×0.05) when this size of loss might arise. VaR is an estimate of the likely loss, but actual losses may be either above or below VaR.

Risk control tool

Both the confidence level and holding period can vary. If prudent managers request that the confidence level is increased, that will lead to a higher VaR. As a general rule VaR also rises as the horizon period lengthens, but the relationship is not linear. The ability to fine tune a VaR calculation in this way is attractive because it allows senior management to express objectives in terms of either the maximum acceptable likelihood of loss, or a monetary value, with the holding period being selected to reflect the frequency of trading on the portfolio. VaR can then be used as a control tool, through a comparison of actual losses to VaR. If losses exceed VaR on more than the expected number of occasions, then this indicates either excessive risk taking or a poor VaR model. Whatever the cause, it flags up the need for action and in this way VaR forms an important component of a broader risk management system.

The uses of VaR

VaR is clearly a useful risk measure for banks and financial institutions that are involved in regular trading activity, but it is tempting to dismiss VaR as having limited relevance to non-financial corporations. This would be a gross underestimation of its usefulness. VaR can be used in a variety of contexts and consequently its use, and external reporting, is rising. VaR can be calculated in respect of a wide range of different risks including:

- credit risk
- liquidity risk
- insurance portfolios
- pension funds
- earnings risk
- cash flow at risk.

In the case of credit or liquidity risk, VaR uses information (often based on historical data) to measure the possible losses from default at a defined probability level. In the case of highly geared companies, this allows them to plan activities in a way that strictly limits the likelihood of breaching technical debt covenants. For insurance companies holding a portfolio of contracts comprising various types of insurance, VaR can be used to estimate the value of claims to be paid out and assist in managing the volatility of future earnings.

The introduction of FRS 17 – the pensions standard – has led to increased management awareness of the value of company pension funds, because of the rules on disclosure of surpluses/deficits. VaR can be a useful tool for helping manage the risk of huge variations in the potential surplus or shortfall in company contributions. Such volatility is a particular characteristic of defined benefit schemes, where managers face uncertainty over the employment, retirement and salary profiles of scheme members.

Managing earnings volatility

More broadly, VaR is now seen as a potentially powerful model for managing the overriding problem of earnings and/or cash flow risks within multinational corporations. A board of directors may set an earnings target of 80 pence per share, but also be aware that, if the EPS fell below 70 pence, there would be strong adverse reaction from the market, causing the share price to fall. The board may therefore wish to ensure that there is only, say, a five per cent likelihood of earnings falling to 70 pence per share. It is possible to construct a model that measures the sensitivity of earnings to changes in the market prices of financial assets/liabilities, and compute a VaR which estimates the drop in earnings that might be expected if such risks were left partially or wholly unhedged.

Where companies have global operations that trade across a range of currencies and interest rate regimes it is quite likely that such currency and interest rate risks interact with one another. Historically companies have tended to hedge risks independently as transactions occur, but VaR can treat the various risks as a portfolio of related components that can be managed together.

Microsoft uses VaR to manage aggregate risks in this way. Currency, interest rate and equity/investment risks are hedged in combination to take advantage of the diversification effects within the portfolio. The company then uses simulation analysis to estimate and report a VaR figure which shows the potential loss on the combined risk

exposures assuming a 97.5 per cent confidence limit and a 20-day holding period. Microsoft points out that the VaR amount does not necessarily reflect the potential accounting losses. Nonetheless, the fact that VaR is used at all is indicative of active risk management which is a positive signal to the market. The VaR can then be compared with overall reported earnings as a sensitivity measure.

In common with all statistical models, VaR has its limitations and the resulting risk measure must be interpreted with caution. Despite some complex, technical reservations, VaR remains the primary measure of financial risk and forms part of the Basel Committee regulations to determine the level of capital that banks are required to hold. It would seem that VaR is here to stay and that the accounting profession needs to learn more about its potential.

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