

Electronic Assignment Cover sheet

Please fill out and attach as the first page of Assignment.

Student (s) Number as per your student card:

_____10115036_____ Michael McMenamin_____

Course Title: Certificate in Funding and Treasury

Lecturer Name: Andrew Quinn

Module/Subject Title: Treasury & Risk Management

Assignment Title: Value at Risk, By Michael McMenamin

No of Words: 2563

Value at Risk

By Michael McMenamin

Sources of Market-based Risk

Market risk is any risk of losses in a bank's trading book due to changes in equity prices, interest rates, credit spreads, FX rates, commodity prices, and other factors. Refers to open (unhedged) positions, and the more volatile the asset price the greater the market risk.

- Things we can't control

Tomorrow a Eurozone country could say it's leaving the Euro, the Euro goes down 10%. We can't control that.

- Commodity Risk

Companies like Ryanair in the transport industry have commodity risk; the price of crude oil and aviation fuel. Technology manufacturers such as Apple watch the price of precious metals used for components in their products.

- Country Risk

The risk of doing business with a country steeped in political turmoil, the Ukraine and Russia are examples in 2014. The government could take over your company, change taxes, sanctions could be imposed affecting your distribution and cash flow. Scotland could become independent.

"A vote for independence would introduce regulatory uncertainty in Scotland,"

said Kieron Stopforth (Scotland Yes Vote, Bloomberg 8/09/14). Renewable power projects worth 14 billion pounds could get cancelled.

- Operational Risk

The risk of technology or support systems failing. Computer system crashes and undetected weaknesses in security are a constant threat; magnified loss of customers, compensation, and brand damage. Rogue traders, someone who is acting irresponsibly or illegally, have caused damage to many banks and still are today.

Heavier focus on trading income over traditional activities increases market exposure.

To manage market risk, banks use different statistical techniques. Including value-at-risk (VaR) analysis, which is the established standard in measuring market risk.

- Liquidity Risk

A sudden surge in liability withdrawals; cash or claims demanded. If a banking system is undercapitalised we have seen what happens, the liquidity problem turns into an insolvency problem where assets are zero and that is the collapse of the bank.

The three main approaches to calculating market risk exposure are:

- RiskoMetrics (or the variance/covariance approach)
- Historic or Back Simulation
- Monte Carlo Simulation

The RiskoMetrics Model

The purpose of risk management models can be described by this quote from Dennis Weatherstone, former chairman of J.P. Morgan Chase: “At close of business each day tell me what the market risks are across all businesses and locations.” He wanted a dollar amount that tells him what exposure they have for the following day.

- Market risk = Estimated potential loss under adverse circumstance. (Financial Institutions Management, Saunders A. p286)
- For a daily measure of the firms’ risk, daily earnings at risk (DEAR) is used
- DEAR = Dollar value of the position * price sensitivity of the position * potential adverse move in yield
- Based on fixed income, foreign exchange and equities

Observation

Price sensitivity and adverse yield is measured as the financial institution chooses, using its own models. This inherent weakness can potentially lead to an inaccurate VaR.

Multiplying the DEAR by \sqrt{N} will give addition days earnings at risk. However, due to extreme market conditions over an extended time, it is quite possible that this situation could wipe out a financial institution. This is a huge danger.

Historic or Back Simulation

- Using past data to generate a price.
- Compare it to current prices to create a value of the portfolio.

Obviously the big issue with this method is how far back the data goes, and how far back we decide to use for the sample of returns.

Observation

Morgan Stanley changed its historic VaR model in 2012 from four years of data to just one year, changing its VaR projected loss of \$82m per day to \$62m per day. (Financial Times 10/2012). This helped reduce its regulatory capital requirements. Prof Pablo Triana observed: “Just change weights on data and, *voilà*, you are perceived as less risky.”

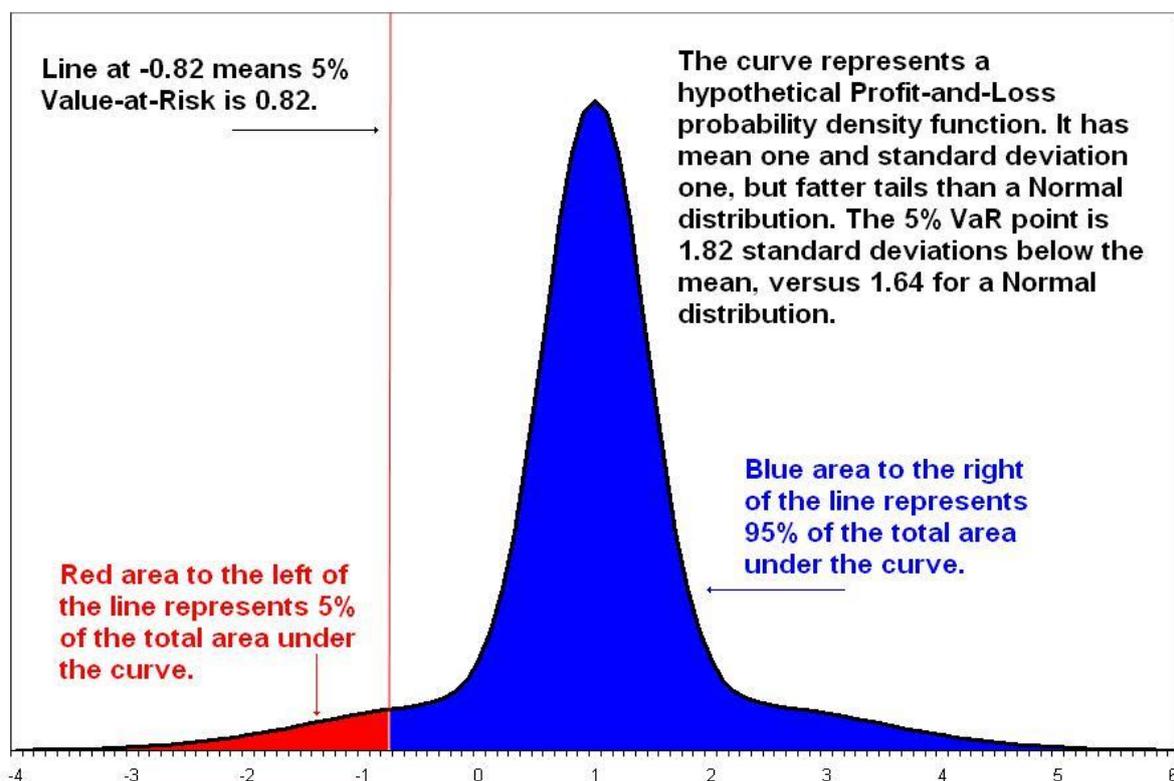
Historic could be a useful feature of VaR for banks, but a weakness in overall integrity for VaR estimates.

Monte Carlo Simulation

- Generating additional observations when you run out of real observations
- Based on probability and frequency distribution

These simulated samples can then be analysed in the same way as a historical sample. This simulation gives a better idea of potential risks in the tail of the distribution. (See VaR diagram 1.0 below, tail on left side).

VaR Diagram 1.0



“Banks are increasingly emphasizing a second technique as an additional complement to VaR: stress testing against coherent and internally consistent scenarios, systematically generated from historical stresses (for example, a repeat of the Asia crisis) as well as hypothetical emerging risks, such as a Eurozone breakup, further downgrade of US sovereign

Debt or currency devaluations. While banks largely use stress testing as a way of limiting losses or setting capital requirements, more nimble organizations on the buy side use them as dress rehearsals for crisis management.” (Managing Market Risk, McKinsey, p8)

Limitations of VaR

- VaR provides no information as to the size of the maximum loss

For example a VaR estimate of €100m at the 95% confidence level. There is a 5% probability that the firm will make a loss in excess of €100m. Equally, this VaR could mean the firm has a 5% probability of losing €101m, or €100 Billion. Some have argued that:

- “We should not estimate VaR itself, but the maximum loss or expected loss in excess of VaR.” (Risk Management, Stulz M. p625)

However, it is not practical to concentrate on the maximum loss as this would be infinite if there is uncertainty. The nature of a loss made by a firm in excess of VaR can have a serious effect on its credit rating.

Computing losses exceeding a threshold using distributions is called Expected Tail Loss or Conditional VaR.

- “VaR is a statistical estimate. Like all statistical estimates, it is affected by sampling variation.” (Risk Management, Stulz M. p617)

If a firm makes the wrong decisions or uses wrong data its VaR will be of poor quality and potentially dangerous to the stability of the firm during adverse conditions.

- VaR is very vulnerable

VaR doesn't add up all the risks. Fat tails to the left side of the curve (diagram 1.0) tend to be more unpredictable and nasty. The ‘confidence interval’ by its very name can give the casual investor a false sense of security as this indicator does not correspond to safety, and possibly could be changed to something more appropriate such as ‘possibly safe interval’.

Capital Requirements

- Capital adequacy is the primary protection against insolvency and failure

“The market risk capital requirements are intended to ensure that banks hold sufficient capital to withstand prolonged and/or severe adverse movements in the markets affecting their portfolios.” (Bank Capital Requirements, Hendricks, D. p4)

- VaR is a key component considered for regulatory capital

It is critically important because the lower the VaR the less a financial institution has to set aside.

“Capital requirements...can be very effective not only in curbing portfolio risk but also in inducing truthful revelation of this risk.” (Analysis of VaR, Cuoco, D. p1)

- Stress Tests

2014 has been an important year worldwide for bank stress tests. Failing a stress test means the bank must resubmit its report and involves bans on increasing dividends and share

buybacks. This year, five of thirty U.S. banks failed stress testing by the Federal Reserve (Citi and four Other Banks, Fortune, 26/03/14). Citi Group was one of those banks and the Fed was not satisfied with: “Citi’s inability to predict how much it could lose in a severe economic downturn.” Citi’s shares dropped 6% after it failed the stress test.

In November, 131 of the largest E.U. banks will be put under the magnifying glass by the ECB. Risk models will be tested for areas such as sudden drops in property prices, ship financing, unemployment rate changes, oil price movements and, increasingly, terrorism by computer hacking. Cyber terror is evolving:

“A worst-case event that destroyed records, drained accounts and froze networks could hurt the economy on the scale of the terrorist attacks of Sept. 11, 2001.” (Cyber-Terror, Bloomberg, 30/08/14)

Limitations & Criticisms of current Risk Management Practices

“VAR and other risk models have continually come up short. The 1998 crisis at Long Term Capital Management demonstrated the limitations of risk modelling. In the violent market upheavals of 2007–08, many banks reported more than 30 days when losses exceeded VAR, a span in which 3 to 5 such days would be the norm. In 2011, just before the European sovereign crisis got under way, many banks’ risk models treated Eurozone government bonds as virtually risk free.” (Managing Market Risk, McKinsey p1)

- Assumptions

70 years of data is very different than 2 years of given data. A lot of new products including OTC over-the-counter-derivatives and exotic finance products were launched with no or less than 2 years of previous data. Massive assumptions about these products were made. A return could be -40% next year. The standard deviation can mask these big losses or risks in a data set.

- Standard Deviation

Banks risk-managing around standard deviation will never have enough capital to repay if there is volatility; let alone what happened during the financial crisis. The Bell curve and normal distribution are important, but the problem is we rely upon them too much.

Nassim Taleb is a vocal critic of VaR. He believes that we really don’t know much about the world around us, therefore trying to predict what will happen is as futile as saying ‘I knew this was going to happen’ about a past event.

“You tend to think that the crisis is (at the) middle or towards the end. I think we may be in the very beginning; we’re going to have a change of scenery. The crisis may not even have started yet.” (Taleb, N.)

- Models

The system of risk management in 2007 and 2008 including Basel II was designed specifically to avoid the crisis that prevailed. Financial models with inappropriate or insufficient data were blamed, and are still of concern today.

- Accountability

If we look back at the recent Anglo Irish Bank debacle and the trial resulting in no prison sentences being imposed, and the burden of the bank's collapse being put on the Irish taxpayer, it would seem that there is a lack of accountability in financial institutions, year after year, crisis after crisis. The risk models that we use do not seem to work, or only work when it suits us. People cannot be trusted with numbers; they will always come up with a way to meddle until a satisfactory magic number for a situation is achieved. What is the worst that could happen? You will still be paid your bonus.

Possible Regulatory Responses

“Changes have occurred in lending institutions and the markets they operate in. Dynamic trading markets have evolved for loans. Banks shift their credit exposure through transactions with counterparties. Financial innovation has taken risk and repackaged it into parts that appeal to different types of investors.” (Managing Credit Risk, Caouette, J., p4)

- In 2014 banks still regulate themselves

Banks still estimate their own ‘market risk’. People in decision making roles are allowed to take what they want from data, which is not good. What people think they know and complacency causes problems and partly caused the financial crisis. Banks are businesses with the primary objective of making a profit from borrowing and lending money. They are fundamentally important to the running of a country. These financial institutions are a unique type of business model, different from all other organisations, but letting each one choose their own models, and come up with their own figures, to suit themselves, means a radical overhaul is needed, or nothing will change.

- Evaluate

“It is important to evaluate managers' bets on a risk-adjusted basis and relative to the market. If risk managers want to behave like money managers, they should be evaluated like money managers.” (Rethinking Risk Management, Stulz R. p1)

Identify and assess the risk. Will it put the organisation in danger?

Risk and return are directly correlated, but it changes and evolves and is inherently difficult to predict.

Goldman Sachs realised early on that something was going on that the VaR models couldn't show. They went back to gut instinct rather than models, and survived.

- Cultural Change

“Cultural change at financial firms is slow. With reference to reforming the financial sector chairman of the Treasury Committee, Andrew Tyrie said: “Financial regulators needed to up their game. They need to exercise much more judgement than just do a bit of box-ticking and then go home - box ticking which they think will cover their backs. We need to get to a fundamentally much better place where people can rely on high quality advice, where they will start to trust financial institutions again.” (Tyrie A., Regaining Trust 3/09/14)

- Liquidity

“The undervaluation of liquidity in crisis times in turn leads bankers to take on excessive risk and buy insufficient insurance in their financing decisions, and to undervalue the benefits of raising new capital in crises.” (Korinek A. Systemic Risk-Taking p31)

- Credit Rating Agencies

Credit rating agencies are an extension of credit scoring. AAA-rated banks can default, but psychologically people thought that they could not. Ratings can migrate from one rate to another. Perhaps less emphasis should be placed on these agencies. They only offer an opinion, their information is not binding. The big three compete with each other to get a rating for a customer. A better rating means lower cost for your bonds. This system is not working as it should.

- Basel III

Basel is a globalised regulatory body which provides recommendations. “In China, banks have been busy tapping markets to raise funds to boost capital buffers.” (Finance Asia 31/08/14). Most banks in Asia are healthier and better prepared for the more stringent Basel III accords because of the not so long ago Asian Financial Crisis of 1997.

“Although the transitional period appears long, the 2019 deadline to complete implementation should not distract institutions from the need to demonstrate capital and liquidity resilience much earlier and meet interim deadlines along the way.” (KPMG Basel III (2011) p1)

The guidelines are there, compliance with Basel III is inevitable, so it is important and worthwhile for firms to start preparing now rather than later.

Conclusion

“Risk is a choice, rather than a fate.”

Peter. L. Bernstein

- Banks have never done a good job at managing their risks

Over hundreds of years, banks have lost more money than they have made, with all the bankruptcies. They didn't do a good job of pricing the risk of the money they lent. There is room for improvement.

- Central banks and regulators are moving in the right direction

Banks are important and how they manage risk is important. You can't eliminate all risk when running a company. Risk is difficult to measure so we rely on standard deviation and common sense. The model doesn't know or care about a credit crisis. Rate volatility is the new normal. We don't know the outcomes because what's happening is new.

"Today there are still banks lending money at rates that do not reflect the risk, but we won't find out for 5 years." (Quinn A. 07/2014)

Banks are hoarding a lot of money now, similar to the Central Bank, because they are more risk averse, safety-conscious. As Nicholas Taleb said, we are actually only at the beginning of the economic crisis, and the worse is yet to come. Let us hope, on this occasion, he is wrong.

References

Bloomberg, (8/09/14) Scotland Yes Vote Risks \$23 Billion in Power Work
<http://www.bloomberg.com/news/2014-09-07/scotland-yes-vote-seen-risking-23-billion-in-power-work.html>

Saunders, A., Cornett, M. (2011) Financial Institutions Management, A Risk Management Approach. U.S. McGraw Hill International

Triana, P., (17/10/2012) M Stanley shows the 'flaky' side of model, Financial Times, U.S.

VaR Diagram 1.0, (03/09/14) Value at Risk, Wikipedia online,
http://en.wikipedia.org/wiki/Value_at_risk

Mehta, A., Neukirchen, M. (May 2012) Managing Market Risk: Today and Tomorrow, McKinsey & Company Working Papers on Risk, no. 32
file:///C:/Users/Laptop/Documents/DBS/Risk%20assignment/Working_Papers_on_Risk_32.pdf

Stulz, R., (2003) Risk Management & Derivatives, U.S. Thomson South Western

Hendricks, D., Hirtle, B., (Dec 1997) Bank Capital Requirements for Market Risk: The Internal Models Approach <http://www.newyorkfed.org/research/epr/97v03n4/9712hend.pdf>

Cuoco, D., (Apr 2003) An Analysis of VaR-based Capital Requirements
http://papers.ssrn.com/sol3/papers.cfm?abstract_id=470904

Gandel, S., Fortune Online (26/03/14) Citi and four other banks stumble in Fed stress tests,
<http://fortune.com/2014/03/26/citi-and-four-other-banks-stumble-in-fed-stress-tests/>

Dougherty, C., Bloomberg Online (30/08/14) The Cyber-Terror Bank Bailout: They're Already Talking About It, and You May Be on the Hook
<http://www.bloomberg.com/news/2014-08-29/next-u-s-bank-bailout-could-come-after-a-cyber-terror-attack.html>

Taleb, N., Youtube (05/09/14) <https://www.youtube.com/watch?v=C9AJeChMa14>

Caouette, J. Altman, E. (1998), Managing Credit Risk - The Next Great Financial Challenge
<http://books.google.ie/books?id=FOJBUJOAN9AC&pg=PA4&dq=changes+have+occurred+in+lending+Caouette,+J.+1998&hl=en&sa=X&ei=koKVPbAKYae7AbqvoDIDQ&ved=0C CAQ6AEwAA#v=onepage&q=changes%20have%20occurred%20in%20lending%20Caouette%2C%20J.%201998&f=false>

Stulz, R., (08/04/05) RETHINKING RISK MANAGEMENT, Journal of Applied Corporate Finance Volume 9, Issue 3, pages 8–25, Fall 1996

<http://onlinelibrary.wiley.com/doi/10.1111/j.1745-6622.1996.tb00295.x/abstract;jsessionid=E9BC58CCBB704568C9FDC82408CF1F63.f03t02?deniedAccessCustomisedMessage=&userIsAuthenticated=false>

Tyrie, A., BBC News Online (03/09/14) Regaining trust in banks 'years away', says Andrew Tyrie <http://www.bbc.com/news/business-29046605>

Korinek, A., (May 2011) Systemic Risk-Taking: Amplification Effects, Externalities, and Regulatory Responses http://indstate.edu/business/NFI/leadership/papers/2011-WP-13_Korinek.pdf

Tai, S., Finance Asia Online (31/08/14) Asia-Pac banks sail through Basil III transition
<http://www.financeasia.com/News/389839,asia-pac-banks-sail-through-basel-iii-transition.aspx>

KPMG (2011) Basel III: Issues and Implications
<http://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/Documents/basel-III-issues-implications.pdf>

Peter L. Bernstein, Economist

Quinn, A., (2014) Lecturer, Dublin Business School