Quant Perspectives

A Flight Simulator for Financial Risk

Airline pilots learn critical skills in the safety of a flight simulator. Financial risk managers would benefit from a similar tool, so let's build one for them.

By Joe Pimbley

While prudent models for VaR, loss distributions, economic and regulatory capital are valuable components of risk management, they suffer the shortcoming of ignoring the unscripted actions that managers and executives would take during a downturn. It therefore makes sense to develop a "Banking Simulator" (similar to a flight simulator for pilots) that can aid the education and development of financial risk managers and business heads.

We're proposing a supplementary simulation model that permits and expects the "player" to make risk-mitigating (or business enhancing) decisions every simulated quarter – both in reaction to past events (asset losses, for example) and in anticipation of future events.

As with true flight simulators for airline pilots, the goal of a banking simulator is to give the user practice in simulated, but realistic, market and risk scenarios. With a well-crafted banking simulator, this training and learning will improve the preparedness, conceptual understanding and risk culture of a financial organization.

Risk Management may be Strong or Weak

As risk professionals, we would all say that it is, of course, better to have strong risk management than weak risk management. But what does one measure to prove the efficacy of risk management?

A bank with no significant negative events over the past five years may simply have had good luck. Conversely, unexpected losses might afflict a firm with solid risk management. Such events are stochastic, and hence it is challenging to infer quality of risk management from actual gains and losses of the bank.

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Yet we *can* say that strong risk management is expensive relative to weak risk management! The former requires more and better staff, as well as greater investment in data and risk systems. The higher cost appears in every quarter's income statement as a drag on net income.

Our professional community believes strong risk management is well worth the increased cost, but we haven't proven this belief. In response, we have developed a Banking Simulator that gives the user the ability to see the cost-benefit trade-off and to prove the importance of strong risk management through simulation.

The first screen of our Banking Simulator, which demonstrates the clear choice of quality of risk management, is visible below. (We label the user as the "Bank CEO" here, rather than "CRO" or "risk manager" or "trainee.")


Executives Face *Many* Decisions Every Quarter

We show below the most important single screen of our Banking Simulator. It is evident that the "CEO" has many, many choices to make each quarter. He or she may, for example, issue or redeem debt, deposits and equity; change the equity dividend; and buy or sell risky assets.

The bank's net income and stock price provide immediate feedback, but the Simulator offers far more critical information for business and risk

management in the financial statements and asset-liability maturity graph – both of which the "CEO" can see with button clicks.
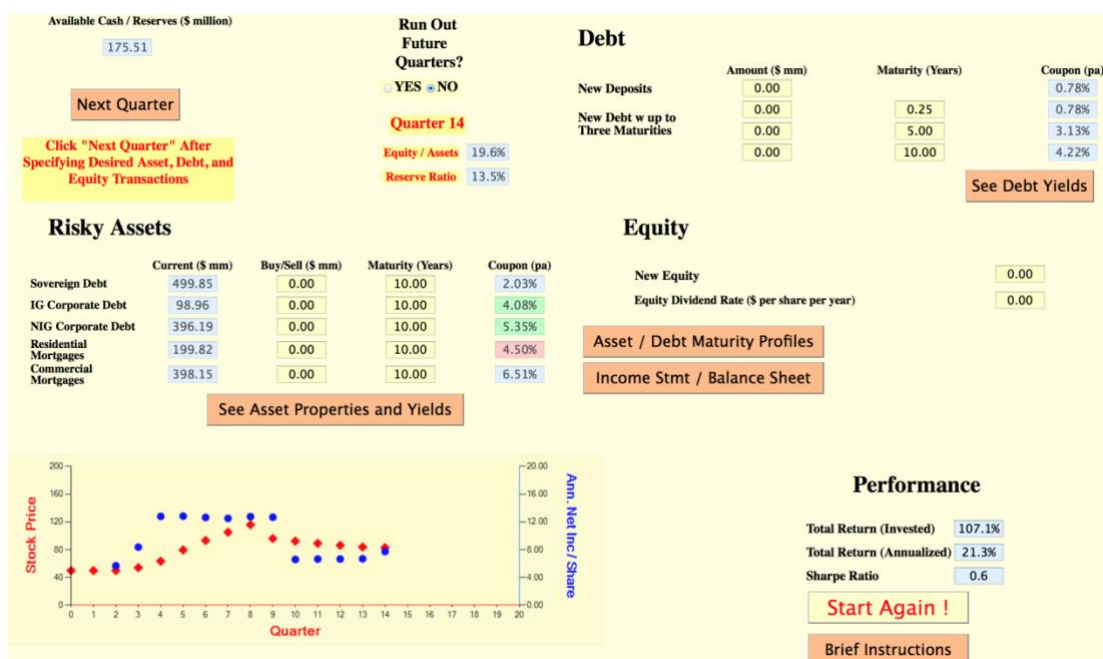
Through the Simulator, the "CEO" will develop skill, intuition and deeper knowledge of the operations of a bank.

Stress Tests, Bank Runs and Insolvency

Whether running an entire bank or focusing on the risk management function, executives do much more than manage assets and liabilities and watch how loan losses impact net income and stock price. For example, they account for the possibility that depositors may stage a "run" on the bank in an instantaneous and seemingly random manner.

What's more, executives must deal with new and stricter regulations. Many global jurisdictions now impose annual stress tests and other regulatory obligations. Further, recognizing that a particularly severe quarter for a highly-leveraged lender may bring immediate insolvency, a realistic simulation must continuously check both for balance sheet solvency and regulatory capital adequacy.

Our Banking Simulator incorporates all these elements.

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Run on the Bank !

Depositors Remove 10% of Funds

No Debt Issuance until the Run Subsides

Issue Equity or Sell Assets if Need Cash

Available to Everybody

Our Banking Simulator is freely available as a web application at this link for the target audience of students and training programs. We welcome all feedback!

Joe Pimbley (FRM) is a financial consultant in his role as Principal of Maxwell Consulting, LLC. His expertise includes enterprise risk management, structured products, derivatives, investment underwriting, training and quantitative modeling. He is the co-author of "Banking on Failure – Fixing the Fiasco of Junk Banks, Government Bailouts, and Fiat Money."

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