

BTRM

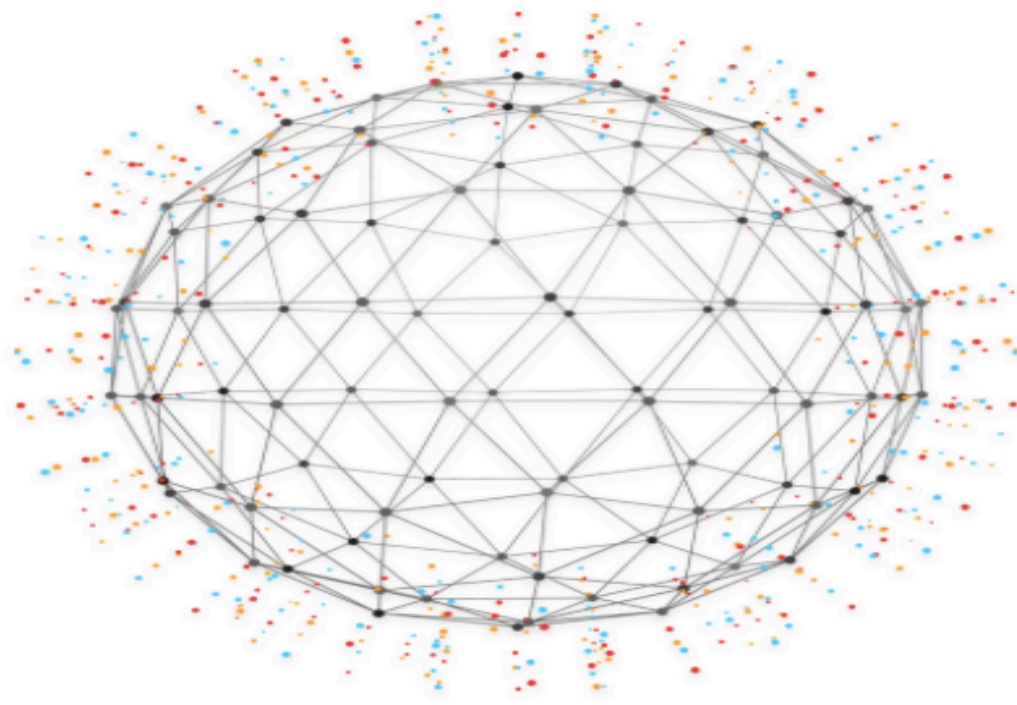
The Certificate
of Bank Treasury
Risk Management

De-Stress Tests for Strategic Treasury

Thought Leadership Series

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In the years since the financial crisis the requirement to meet increased regulatory reporting demands has mainly fallen to the Treasury, Finance and Risk functions within a bank. Financial risk management complexity has increased substantially with **Stress Testing** at its core.

The **Strategic Treasury** view of enterprise risks is highly valuable for executive leadership and offers the prospect of turning the costly exercise of regulatory compliance to a distinct business advantage.

With the vast resources that our industry has dedicated to data collection, preparation, model development and reporting, the opportunity to become more efficient in this process and yield insightful business strategy outputs is compelling. Technology advances now enable the use of Artificial Intelligence and Predictive Analytics at a scale and speed previously not possible.

Robotics and artificial intelligence is already radically changing sectors of the financial services industry, such as wealth and investment management, as robo-advisors replace traditional consultants. A similar transformation is underway in Treasury, Finance and Risk, which could free up employees from routine tasks, mean that resource savings can be made and value realised from the vast data sets collected.

This article looks at the potential benefits to bank Treasury departments of adding simulation and predictive analytics to their processes.



Advanced Analytics Steps, courtesy of [Simudyne](#) © 2017. Used with permission.

The pace of advancement in analytics and computational capacity over the last decade has begun to offer the opportunity for executives to approach strategic decisions in new ways.

What happened, why it happened, what might happen and what actions might be taken to safeguard a bank's position are elements of **Simulation and Predictive Analytics**. Lessons from the past can be highlighted and risk scenarios tested so that better informed decisions can be made.

Justin Lyon, Founder and CEO of Simudyne, says *“Predictive analytics can be thought of as a three legged stool. There are three disciplines that you need to bring together to do it properly. The first is machine learning, this is a statistical approach that involves trying to understand patterns in data. The second is computational simulation, this involves recreating the real world in a virtual world and understanding how entities within these worlds interact. The third, network modelling, involves using graph theory to understand interconnectivity in complex networks.”*

Justin adds, *“The necessary computational power and resources to weave together these technologies at pace and scale are now available, accessible and reasonably priced. The advent of commodity hardware available in the cloud in combination with the widespread availability of open source cluster computing frameworks means that large scale predictive analytics is now possible. This kind of analysis helps us understand complexity. In an increasingly interconnected world, it is essential that we capture the feedback loops and contagion risk inherent in the complex systems that make up ours.”*

	Risk-weight migration, Credit loss hits capital, Increase in	Maturities shorten, mix changes, funding run-off or “run-in”	Commitments drawn, securitization backup, liquidity puts exercised	Securities prices fall
Regulatory ratio constraints affected	Risk-based capital ratio		Risk-based capital ratio	Risk-based capital ratio
	Leverage ratio	Leverage ratio	Leverage ratio	
		Liquidity coverage ratio	Liquidity coverage ratio	Liquidity coverage ratio
	Net stable funding ratio	Net stable funding ratio	Net stable funding ratio	Net stable funding ratio

Source: OFR Analysis
Reproduced courtesy of **Simudyne*** and **Cloudera***

The role of Treasury, Finance and Risk is to manage risks related to the financial well-being of the organisation. To achieve this models are applied to credit, liquidity, collateral, and funding risks, to name a few. These models produce a significant amount of data that when coupled with enterprise wide inputs from product development or client analytics, deliver insights to risks or opportunities which influence not only financial risk management but also corporate strategy.

Enterprise wide data access used to just be a key part of compliance. Now that we have the ability to use that data to run simulations of the future, we can use it to think of new ways to drive business as opposed to just regulatory compliance or managing business risks.

It creates an **opportunity** for banks is to apply their risk management discipline and compliance frameworks to company-wide strategy.

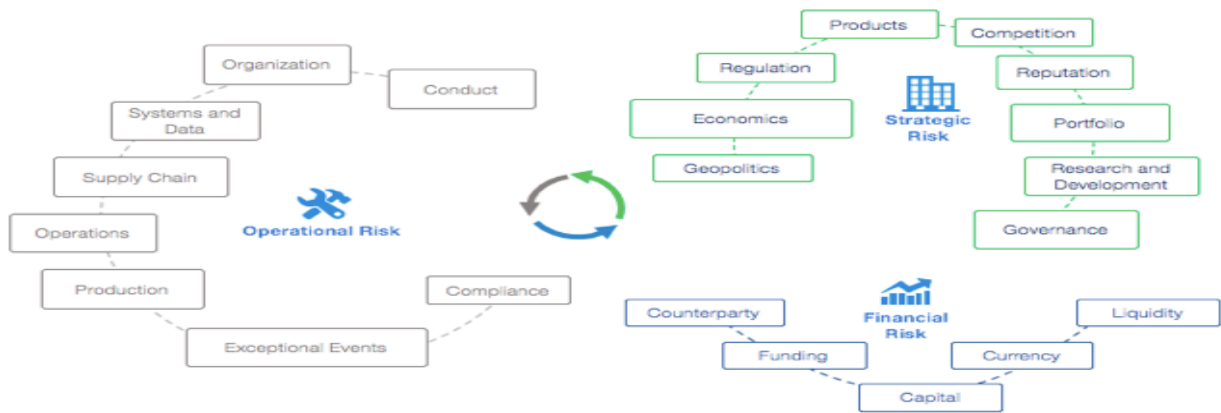
The BIS have categorised four **key intermediation functions** that banks are engaged in:

1. Credit Transformation
2. Maturity Transformation
3. Liquidity Transformation
4. Collateral Transformation

All too often a risk is not identified until it happens and the related impacts of an event can have drastic consequences for a company. Each of these risk transformation areas create channels through which stress can be transmitted to and throughout the bank.

Justin says that *“There are a number of questions a bank needs to answer when it comes to managing its risk and making decisions going forward. Principally, it needs to ask what happened historically and why did it happen? These questions tend to be answerable with standard statistical techniques. Descriptive statistics will tell you what happened and give you an idea of why they did. However, when it comes to answering the harder questions such as what could happen and what should we do, you need to turn to computational simulation. Many of these techniques do not rely solely on statistical relationships.”*

“As we’ve discovered, the past isn’t always a good guide to the future. When we’re caught off guard, it tends to be by events that have not previously happened. To forecast these events you need to understand the physics of them. This means mapping out the entire system you’re observing, recreating all the points of interaction and then shocking the system to see how interacting parts respond. This can help you spot looming risks such as counterparty credit risk or contagion risks or marketplace threats.”

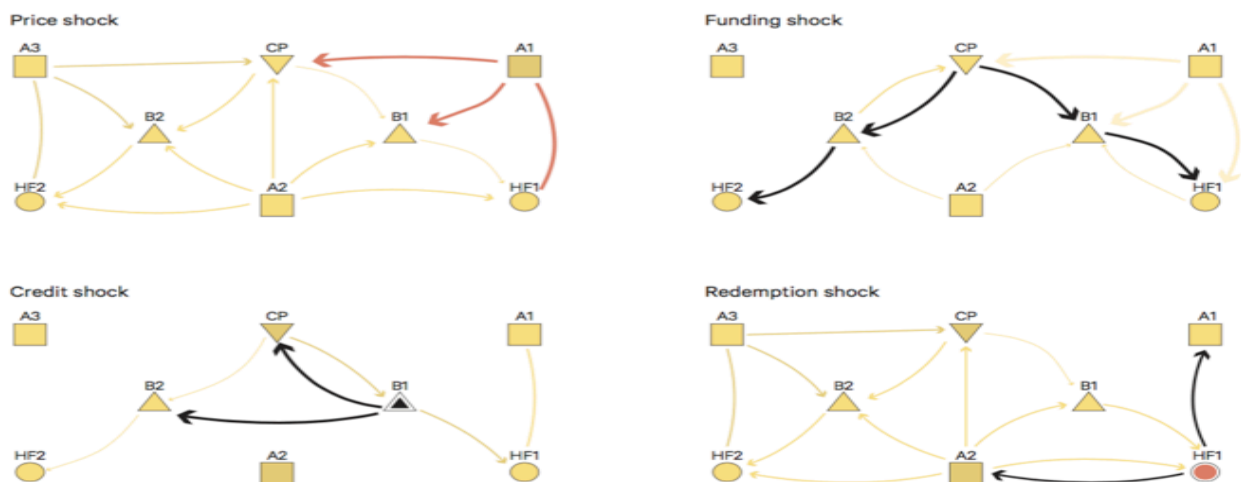


Enterprise Wide Risk Management Inputs

The interrelated elements of a bank's geography and franchise beyond the four BIS risk transformation elements form a broad risk management framework requirement. While techniques applied in each of these areas commonly address business or risk specific approaches, what we show here is that the number of interrelated risks can be substantial and these channels of risk transmission can be modelled.

Agent Based Modelling is designed to be applied in a wide range of stress testing scenarios which include changes in funding patterns or availability, credit rating migration or both asset and liability redemption shocks. This will enable ALM managers to understand the sensitivities of the balance sheet more effectively and also allow the business to understand the behavioural patterns of product and customer types at a granular level. In turn this enables the Risk department to design more tailored stress scenarios, as they can devise situations that would impact specific parts of the balance sheet.

On a “BAU” basis this tool would allow the bank to move to a true strategic ALM posture, because (i) for new products or customer franchise areas, the expected impact to net interest income and net interest margin will be more predictable, and (ii) the impact on the balance sheet of changes in anything from one to multiple internal and external factors, such as rates, defaults, unemployment, inflation and so on can be modelled with greater clarity.



Network view of Initial Shock Propagation. Reproduced courtesy of Simudyne* and Cloudera*

The flexibility of agent based modelling approach is ideal for creative stress testing. It is used to search for and identify the weakest links or bottlenecks that might be the point of failure which transmits stress across an organisation. As regulators continue to raise the bar in their expectations of what constitutes a robust stress testing model, firms must learn to map enterprise wide risks and their impact, both pre and post **management actions triggers**.

It is imperative that firms implement **large-scale simulations** to drive their predictive analytics . By doing so, they increase reporting efficiency and improve their strategic risk management.

The **risk** for an organisation of not adopting enterprise wide risk management approaches is that of being caught “off-guard.” It raises the possibility of continued fire-fighting rather than an organised and intelligent approach for executive decision making. Banks, Energy Companies and Regulators are already adopting these approaches.

As these advanced analytical approaches are implemented, quants and data science expertise inside an organisation become more efficient at meeting the immediate demands of compliance and may begin to work with risk owners to run simulation analysis exploring different paths to manage risk, reduce balance cost, or more effectively structure a funding and collateral management base.

Potential Uses For Scale Simulation and Predictive Analytics In Banking

Increased efficiency in stress testing (liquidity and enterprise)

Modelling of isolated risk event transmission across the bank

Simulation of Credit events across a portfolio or balance sheet

New product implementation impacts of client behaviour and value

Simulate changes in funding patterns, availability and cost; better understand balance sheet NII/NIM and forecasting

Enterprise wide impact of bank credit migration

Conclusions

A **Strategic Treasury** approach to bank asset-liability management requires the tools to **manage** the balance sheet, **comply** with regulation and risk appetite and gain **insight** of the complex environment in which we operate. Having these in place turns compliance to **value** added business advantage.

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