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INSIDE THIS ISSUE

editor introduction

Carl Densem
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Dan diBartolomeo returns as the capstone in August to tell us how pension funds and insurance companies have turned into "shadow banks" in the US. What we think we know about the risks is understated, including systemic risk, because of flaws in how risk is estimated for private credit funds. Dan previously wrote in our August 2023 issue about "Why Banks Fail and What to Do About It." We recorded a short interview with Dan about his article, which you can watch on our public LinkedIn group.

Intelligent Risk continues to grow. We receive more submissions than ever and we're looking for your help to expand our offerings. Please contribute to the GoFundMe, which we recently launched to fund improvements in the content's reach and accessibility while maintaining the publication's professional standards and design quality. The generosity of Intelligent Risk supporters who help fund its future development will be recognized in a future issue.

In this issue, among diverse topics you will find:

- In "Operational Risk Capital: Challenges and Opportunities" Peter Ding explains key aspects of operational risk capital application, including distinguishing capital supply from demand, aligning allocation with attribution, and identifying effective risk capital assignees.
- Pete Vatev, and co-authors Pawan Jain and Manu Gupta, describe manipulative practices in "CDS Shenanigans in the SEC Crosshairs" which compromise market integrity.
- And in "Risk Management in the Sand: How a Beach Café Can Serve as a Parable of Risk Management Gone Awry" Ainur Bakiyeva serves up a holiday beach café with a side of risk management lessons. Indeed, it is summer (in the northern hemisphere)

Two recent authors joined Steve in our quarterly "Intelligent Risk presents" webinar on Managing Behavior and Conduct Risk. You can find the recording, slides and Q&A in PRMIA's Webinar Library. We're also proud to highlight the contributions of authors and reviewers across PRMIA. This quarter, Chandrakant Maheshwari presented a webinar titled "Trust Before Scale: The Small Wins Approach to LLMs." See the editor's interview in this issue for a follow up on his webinar.

If you're interested in sharing your thoughts in a future Intelligent Risk or providing feedback on something you read in this issue, we welcome your emails to iriskeditors@prmia.org.

CAPSTONE ARTICLE

Synopsis

The rise of private credit, as a “shadow banking” alternative to traditional lenders, has ignited interest from risk managers on how to measure these illiquid assets. Current approaches suffer from a lack of proper consideration given to default correlations, loss given default and the expected timing of distributions back to investors, among other issues. In this article the authors give context to the rise of private credit, contrast it with other asset classes, and opine on more rigorous risk measurement approaches.

Risks in private credit markets: loan, portfolio, and systemic

by **Emilian** Belev & **Dan** diBartolomeo

introduction

In recent years, the participation of non-bank lenders such insurance companies and pension funds in making loans to corporations and commercial real estate has skyrocketed. While securitizations of such loans have been around decades in the forms of CLOs (collateralized loan obligations) and CDOs (collateralized debt obligations), the vast increase in this area has created a “shadow banking” system that is largely driven by private equity firms.

> ***As lending activity shifts from banks to shadow banking channels, the opacity of loan asset quality is likely to increase, diminishing the ability of end investors to accurately gauge portfolio riskiness. This evolution underscores a trade-off between credit inclusivity and the robustness of risk evaluation mechanisms in the broader financial system.***

It is important to examine the analytical aspects of the risks of private credit, relative to both bond markets and bank lending. We will also consider how the buildup of private credit is a growing concern to central banks (e.g. the US Federal Reserve) as insurance companies take increasingly bank-like activities. Our final assertion is that the systemic risk of insurance companies replacing banks as corporate lenders is especially concerning in the US because there is essentially no regulation of insurance companies by the Federal government. Some states such as New York are considered strict, while others such as Texas and Arizona are often thought more liberal.

Unlike traditional bank lending, private credit funds extend financing to a far broader spectrum of borrowers, including those with lower credit standings or unconventional financial profiles. This inclusivity enables capital to reach enterprises at all stages of their lifecycle, from early-stage ventures to distressed firms, thereby offering unique potential for broad-based economic stimulus. By filling gaps left by regulated banks, private credit funds can facilitate growth in segments of the economy that might otherwise face credit constraints. However, the very flexibility that allows for such inclusivity also introduces important structural and risk-related challenges.

A central concern lies in the interplay between agency problems and transparency. Private credit funds often operate with less standardized lending criteria, tailoring terms to individual borrower circumstances. While this flexibility can be economically beneficial, it also means that investment vehicles—particularly those raising capital from a dispersed investor base—may apply uneven or opaque credit assessments. Because end investors typically have limited capacity to conduct “pass-through” due diligence on ultimate borrowers, they must rely heavily on the fund manager’s internal processes and incentives, creating scope for informational asymmetries.

By contrast, banks operate under a mature framework of standardized lending practices, reinforced by regulatory requirements that prescribe both borrower qualification criteria and disclosure standards. This regulatory discipline enhances transparency around loan portfolio quality and provides more consistent benchmarks for assessing credit risk. As lending activity shifts from banks to shadow banking channels, the opacity of loan asset quality is likely to increase, diminishing the ability of end investors to accurately gauge portfolio riskiness. This evolution underscores a trade-off between credit inclusivity and the robustness of risk evaluation mechanisms in the broader financial system.

analyzing private records

We begin our analytical discussion with a review of the credit rating process for publicly traded firms. Of the roughly eighty thousand publicly traded companies in the world, less than 15% have a credit rating from a regulated credit rating agency (e.g. S&P, Moody’s, Fitch). Corporate ratings are highly fragmented across many rating agencies. No one rating agency covers more than six thousand firms. In some countries (e.g. China), investors often do not attach credibility to local ratings. While the majority of corporate bond market value arises from large firms with ratings, a significant portion of corporate bonds are “unrated”.

Different rating agencies disagree on what a rating should be. Some focus strictly on probability of default (PD) within a year, others PD before maturity, and some consider both the probability and likely loss given default (LGD). Responsiveness of rating changes to new information is slow. The average frequency of rating changes for corporate borrowers is about once every three years. To the extent that borrowers pay the rating agencies, there are significant optimism biases arising out of agency relationships. To address the risk of unrated debt we created our own credit rating system under which seventy-five thousand traded companies are evaluated. Many of these firms have no traded bonds but do have bank debt or loans from other lenders. Each month we categorize the credit quality of each firm into one of twenty categories which roughly parallel the “letter grade” (e.g. “AAA”) categorizations of major rating agencies.

Our analytical process is based on the contingent claims concept of Merton (1974)[1]. This model frames credit risk as an option problem. Equity shareholders effectively have “long” positions in two options, while lenders are “short” these options. The first is a call option, as on the firm’s assets with a strike price of paying off the firm’s debt. The shareholders then own the assets and operations of the borrower outright, just as a homeowner can pay off their mortgage. To the extent that shareholders are not personally liable for firm debt, they can allow the firm to go into default if the value of firm assets goes below the value of the firm’s debt. In effect, shareholders also have a put option on the assets of the firm by declaring the firm bankrupt and allowing the lenders to claim the devalued assets. For this analytical method, the key question is what would the volatility of a firm’s stock be if the firm had no debt? Given the commercial availability of sophisticated risk models for traded equity this is easy to estimate. We can update our ratings daily using our method of conditioning risk estimates on automated analysis of financial news, as described in diBartolomeo, Mitra and Mitra (2009)[2]. The other inputs to the problem are standard option inputs like strike price, dividend yield, risk free rate, and time to maturity. For easy comparison to published ratings history we follow the popular convention focusing on probability of default within the upcoming year.

Obviously, lenders also care about the possibility of receiving partial payment in the event of default rather than assuming there will be no payment at all. The expected value of “loss given default” (LGD) can also be mathematically extracted from the option model. The full mathematical derivation was presented in a published paper on using similar methods for sovereign debt. For details see Belev and diBartolomeo (2019)[3]. Figure 1 illustrates the key features of the framework, with the curve representing the potential distribution of firm asset values, and the value of debt functioning as the strike price of the option. The fraction of the total area within the curve below the debt value is the probability of default.

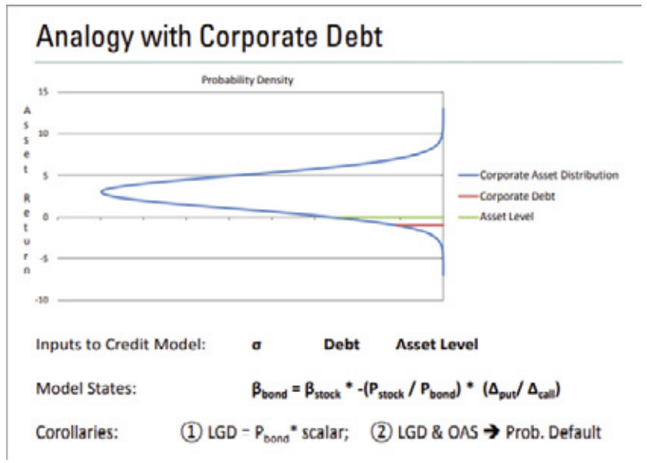

Figure 1. Option model for LGD

To address the risk analysis needs of private credit markets, our existing process for corporate bonds had to be extended in a couple ways. The first extension was for firms where the equity was not publicly traded. While most financial statement items would be available for private firms (e.g. earnings, book value, revenues) we would not have any market value for the firm’s equity, nor any obvious way to estimate the volatility of the unknown equity values over time. One approach is to use a hedonic model (dollars values as the independent variable) to estimate the market value of the private firm equity. The second extension would be to address the fact that individual private loans are very illiquid, while sets of loans packaged into CLOs and CDOs have more but limited liquidity. Volatility estimates for illiquid assets are downward biased by serial correlation. For details see Geltner (1991)[4]. The lack of liquidity has very important implications in terms of estimating the correlations across private loans and hence the risk of securitizations and portfolios of direct loans.

A simple hedonic model can be expressed as a regression equation where the market capitalization of each publicly traded firm is the dependent variable. A separate equation can be estimated for each sector in each country.

MC (public) = f (book value, earnings, book value, revenues, debt/equity ratio)

Our simple hedonic model (i.e. mark to market valuation) for the equity of a private firm is:

*Value (private) = (1-D) * MC (public)*

Where:

- Value (private) = estimated equity value of a private firm
- MC (public) = observable market cap of a “matched” publicly traded firm
- D = decimal representation of a discount for illiquidity (i.e. you have a short position in the option to liquidate)

The first way to estimate illiquidity discount D is to observe that publicly traded closed-end funds in many countries invest in private assets. A recent paper (unpublished) showed that UK traded funds investing in private equity and credit sold at an average discount of 23% relative to published net asset values. The discounts arise mostly from illiquidity, while a small portion of this discount can be attributed to other considerations (e.g. perpetual fees) The second way to estimate the discount is to observe valuations of PE and PC deals in relatively infrequent secondary market transactions. One excellent empirical study of secondary market transactions is Albuqueque, Cassel, Phalippou, and Schroth (2018)[5]. Discounts tend to be in the 20-30% range but vary over time. At the theoretical level, it is useful to explicitly analyze the “option to do something else” and the “option to wait” (i.e. ignore marks to market) which capture heterogeneous investor preferences. The ability to not “market to market” under “hold to maturity” accounting rules have played a controversial role in the distress of financial institutions such as the events at Silicon Valley Bank. Further discussion of embedded options can be found in diBartolomeo (2022)[6] and Belev (2024)[7]. Again, typical discounts are in the 30% range.

An alternative approach to estimating creditworthiness is to directly estimate the cash flows of a security or business enterprise and discount the positive or negative cash flows to present value over the full range

possible outcomes. A traditional discounted cash flow model accounts for the uncertainty of future cash flows by adding a risk premium to the discount rate, but each future cash flow is a point estimate. In Belev and diBartolomeo (forthcoming)[8] we describe a new technique we call EXPLO. In this method, the full range of future cash flows at each moment in time are represented as a distribution so the risk-free rate can be used as the discount rate, like derivative pricing. Treating cash flows as a distribution requires the use of calculus or numerical simulation of the stochastic discount factor. Cumulative negative cash flows can result in bankruptcy and termination of future cash flows. Negative cash flows can also be discounted at an even lower rate, so they count more in the summation of present value. The degree of "risk adjustment" for negative cash flows is tied to the balance sheet strength of the investor. Investors with debt service requirements should be more sensitive to negative cash flows. The degree of additional discount is derived from Litzenberger and Rubinstein (1976)[9] or Wilcox (2000)[10]. For further discussion see Belev (2023)[11].

The EXPLO valuation model finds a natural application within a broader framework for estimating default risk, particularly one that integrates forward-looking forecasts of both loan and collateral cash flows. This approach recognizes that the process of borrower default is not a binary event but rather unfolds across distinct stages, each requiring a different analytical lens and valuation perspective. This model, originally developed to assess the economic potential of illiquid assets, contributes meaningfully to this probabilistic assessment of credit risk by linking asset valuation to cash flow behavior under varying assumptions about borrower viability.

The analysis proceeds in three steps, each corresponding to a progressively more deteriorated financial condition of the borrower. The first stage, which adopts the strictest interpretation of default, focuses on the matching of periodic cash flows from the collateral and those required for loan servicing. This necessitates precise modeling of the stochastic properties of both cash flow streams, allowing analysts to evaluate the probability and severity of shortfalls in any given period. By overlapping the statistical distributions of these flows, one can infer the likelihood that the collateral will fail to meet scheduled debt payments on a timely basis—a form of technical default.

The second stage adopts a more lenient "going concern" perspective, reflecting the practical reality that lenders often tolerate temporary payment shortfalls. Here, the analysis compares cumulative cash flows from both the collateral and the loan over a longer horizon. Shortfalls in one period may be offset by surpluses in another, as the emphasis shifts from punctuality to the eventual ability to repay. Finally, the third stage contemplates the borrower as a "non-going concern," where both periodic and cumulative tests of debt service capacity have been breached. In this liquidation scenario, the only remaining basis for repayment is the current market value of the collateral. Robust modeling such as EXPLO model can provide a probabilistic valuation of the collateral under stress conditions, becoming instrumental in quantifying the expected recovery and the residual probability and severity of default. Through these stages, the model contributes not only to valuation, but to a nuanced view of credit deterioration over time.

Another approach to creating an internal rating process is to build non-parametric models based on the Analytic Hierarchy Process (AHP) proposed in Saaty (1980)[12]. These models break the processes followed by traditional credit analysts into a series of multiple-choice questions, which can then be filled in based

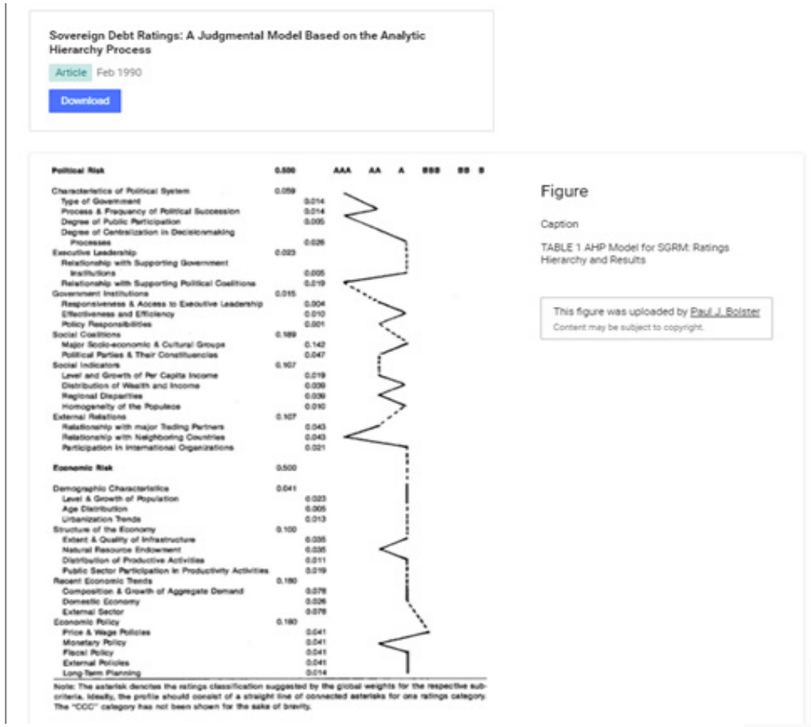

Figure 2. Example of Analytic Hierarchy Process for sovereign bond rating

on company specific data. The required number of descriptive matrices is equal to the number of possible responses to an input question plus one. AHP is a widely used approach from the industrial management literature, and AHP-based credit analysis has been around for a long time. Figure 2 is taken from Bolster, Johnson and Srinivasan (1990)[13] on sovereign bonds. A related paper, Bolster and Srinivasan (1990)[14] covers corporate debt.

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private credit portfolios

Beyond evaluation of individual loans, we must also consider the attributes of loan portfolios. Our work in this area was extensively covered in an article in Risk Professional[15]. Loan defaults are relatively rare: it is difficult to empirically estimate ex-ante correlation of defaults. In 1998, the author published a short article criticizing the crude nature of the "binomial expansion technique" then used by Moody's to estimate portfolio diversification within packages of loans in CLOs and CDOs[16]. The same problem arose during the Global Financial Crisis with securitizations of residential mortgages. Risks were heavily underestimated because of rating agency use of the "Gaussian copula" methods that routinely assumed very low correlations across borrowers. For more information, see the article in Wired by Salmon (2009)[17]. The Merton method provides an explicit way to estimate default correlation across any pair of loans as described in diBartolomeo (2010)[18].

Portfolio level analysis must also address the fact that credit returns are asymmetric. In a 2020 working paper, Reconciliation of Default Risk and Spread Risk[19], we showed that many systems for estimating bond portfolio risk are unsuitable for illiquid loans because they assume you can quickly sell the instrument if you believe the creditworthiness will decline. In the case of an illiquid debt security, the investor will typically be forced to hold the security even if it is defaulting, resulting in an asymmetric return distribution. There is a lot more room for the value of a debt to go down in a default than up in the event the creditworthiness improves. Many risk analysis systems use a summary measure called duration times spread (DTS) which expresses how much a portfolio's value could go up if all the securities were magically credit risk-free. The risks are then assumed to be symmetric, so downside risk is equal to the "upside" DTS measure. Credit portfolios are almost never sufficiently diversified to assume normality under the Central Limit Theorem. Proper risk analyses explicitly capture this asymmetry and incorporate skew and kurtosis into portfolio risk calculations. See diBartolomeo (2023)[20].

The last portfolio level risk that must be considered is the expected timing of distributions back to the investors. For a private credit fund, loan repayments from borrowers may be immediately distributed to the investors or reinvested in new lending. Often, private loans to firms may include equity warrants which convert to proceeds only when the entire firm is sold to an acquirer. As such, there is material uncertainty about timing of cash flow distributions (i.e. "when do we get paid out?") for private fund investors. The industry standard model for forming expectations about the timing of payouts is the Takashi-Alexander model[21] which was developed at the Yale endowment around 2001. While algebraically simple, the "Yale" model is deterministic and hence does not provide confidence intervals on the expected timing of investor cash flows. We will leave this issue as an area of future research.

systemic risks

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In terms of the "big picture" we must also consider effects on national economies in general and more specifically the systemic risks associated with loan markets. The migration of commercial lending activity from traditional depository banks to non-bank financial intermediaries—often referred to as "shadow banking" institutions—may carry consequences for the broader economy that extend beyond the immediate structural shift in credit markets. While these entities have grown in importance due to their flexibility, regulatory arbitrage, and responsiveness to investor demand, their inability to create money through deposit issuance marks a significant departure from the function historically performed by banks in the credit creation process.

Richard Werner, widely known for developing the concept of quantitative easing, has advanced a theory that challenges conventional textbook views of banking. Rather than acting merely as intermediaries or passive conduits in the money multiplier process, banks, according to Werner, are active creators of credit money[22]. They do so through a unique accounting mechanism: when a bank issues a loan, it simultaneously books the loan as an asset and credits the borrower's deposit account with a corresponding liability. This internal creation of deposit money is not offset by a transfer of existing funds from other banks or savers. The deposit may then be withdrawn and transferred through the payment system, giving rise to autonomous money circulation, unlinked from the bank's existing balance sheet assets. This process stands in contrast to shadow banking entities, which lack the legal authority to create deposits and are thus unable to generate money in the same endogenous manner.

Consequently, as more commercial lending shifts to these non-depository institutions, the net effect may be a contraction in the effective credit money supply. Because shadow banks must rely on pre-existing funds rather than creating new money, this disintermediation could lead to a structurally tighter credit environment, with downstream effects on investment, consumption, and economic growth. The shift, while subtle in its accounting treatment, could therefore have profound macroeconomic implications, particularly in economies reliant on credit expansion for growth.

We believe that the risks of private credit portfolios are generally underestimated due to poor estimation of default correlations even if default probabilities are well calculated (generally untrue). The potential for a GFC-like contagion effect at a national or global level is certainly plausible. A group of analysts at the US Federal Reserve recently updated this related working paper, Foley-Fisher, Heinrich, and Verani (2025)[23]. The paper addresses how life insurance companies are extensively funding private credit issuance as replacement for traditional banks. The paper points out some particularly troubling aspects to this

development. Life insurance company balance sheets are becoming more leveraged, comparable to banks. To keep overall risk levels within limits most firms are reducing their mortality risk, so mortality risk is becoming concentrated in a few of the biggest life insurance companies.

conclusion

The rapid expansion of private credit as an investment asset class for institutions, particularly pensions and insurers, continues an accelerating trend. Quantitative methods for assessing risks in such investments are less well developed than for bonds, particularly with respect to default correlation, and so the perceived risk of securitizations and credit fund portfolios are downward biased. We have presented multiple analytical approaches to estimating default probabilities in individual private loans. We assert that Merton-type methods offer the most sensible approach to default correlation and hence the risk of private credit funds and securitizations (CLOs and CDOs). An important nuance to understand is the implications of higher moments (skew and kurtosis) on real-world credit portfolios. The implications of the expansion of a shadow banking system must be carefully monitored in terms of macroeconomic and systemic impacts nationally.

It should be clear that a growing fraction of corporate lending is now occurring outside the traditional banking system. Stress testing and other techniques routinely used in banks will be much harder to impose on largely unregulated lenders. The potential risks are no less serious than those that arose from credit default swaps which were a major contributor to the Global Financial Crisis of 2007-2009. We highlight the concern of regulatory “jurisdiction shopping” by US insurance companies wishing to participate more aggressively as lenders. To address this challenge, we suggest that private credit activities be required to report a central information center (e.g. Depository Trust Company) and require private credit activities to be subject to independent “mark to market” assessments for insurers and participating defined benefit pension plans.

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Synopsis

This article points to the scale of losses in recent years stemming from culture and people risk, as well as emerging trends that will sway these outcomes going forward. It outlines the need for proactive risk management and emphasizes the importance of a governance framework in financial institutions that takes seriously culture and people risk.

Building organizational resiliency: managing culture and people risk in financial institutions

by dr. **Jeffrey** Roman

introduction

In the highly regulated and fast-paced world of financial institutions, culture and people risk are increasingly recognized as critical factors influencing organizational stability and performance. From unethical behaviors and poor decision-making to leadership failures and talent retention challenges, these risks can undermine trust, disrupt operations, and lead to regulatory penalties. Addressing these vulnerabilities requires a proactive approach that integrates strong governance, ethical leadership, and a risk-aware corporate culture. Managing culture and people risk for financial institutions hinges on the organization's ability to hire, develop, and retain talent that contributes to the firm's objectives while providing a meaningful return for its workers.

cultural risk

Organizational culture risk—how internal values and norms can undermine goals and lead to ethical, compliance, and reputational failures—was a key focus of Dr. Edgar H. Schein, a pioneering behavioral psychologist. In the 4th Edition of his book ***Organizational Culture and Leadership***, Schein asserted, "The only thing of real importance that leaders do is to create and manage culture. If you do not manage culture, it manages you"[1]. Culture risk shapes how organizations perceive and handle risk at all levels.

At the start of the 2020 COVID-19 pandemic, financial institutions faced new challenges caused by civil authority lockdowns, forcing firms to shift to remote work. Rapid AI adoption, expanding cloud storage, and evolving compliance demands exposed cultural weaknesses in firms in the financial markets. Industry experts have linked culture risk to organizational failures during economic disruptions. David Tattam, co-founder of risk management solution company Protecht[2], noted that poor culture, misconduct, and bias become more visible in hybrid work settings. These issues often stem from both organizational and individual shortcomings, emphasizing the need for proactive cultural alignment between the firm's leaders, its systems, and their staff. ORX, a research firm that tracks operational losses for financial institutions, reported the following types of major incidents in their 2023 report[3]:

- **Transaction Processing Failures.** Transaction-related losses were among the most expensive, totaling nearly €8 billion globally. These losses often resulted from failed transaction processing or accounting errors.

- **Fraud and Cybersecurity Breaches.** External fraud was a persistent issue, with banks reporting 36,811 fraud events in 2023, where the attributed factors were social media scams, organized crime, and banking app vulnerabilities.

- **Regulatory and Compliance Failures.** Improper business practices led to substantial losses, with conduct-related losses amounting to €3.2 billion in 2023.

An organization's ability to manage culture risk sets the foundation for building resiliency through its structure and systems. People risk, how individual acts and conduct within the organization lead to failures (due to inadequate training, illicit activity, and poor accountability) provides opportunities for firms to implement policy and accountability standards. Understanding the connection between culture and people is key to creating proactive, comprehensive risk strategies. By addressing both cultural norms and personal behavior, firms can foster ethical, sustainable workplaces. Learning from recent and topical events helps financial leaders develop their risk appetite, but holistic risk management requires anticipating and managing culture and people risk by identifying and preparing for emerging trends.

emerging trends

The 2023 failures of First Republic, Silicon Valley Bank, and Signature Bank highlighted key culture risk issues. A critical risk measure contributing to their demise included the maintenance of high levels of uninsured deposits during economic uncertainty, especially when inflation peaked at 9.1% in 2022, making banks vulnerable to rapid withdrawals. Another contributing factor was heavy investment by banks in long-term bonds when interest rates were low, and the bank's failure to adapt their fixed-income portfolio when interest rates increased in 2022 and 2023. The FDIC's 2022 Risk Review stressed the need for strong governance and risk awareness to manage emerging threats. Similarly, the Office of the Comptroller of the Currency (OCC) warned of rising compliance risks amid regulatory changes, urging stronger risk frameworks. While financial institutions can't prevent external threats like market or economic shifts, the firm's leaders can strengthen internal culture to improve resilience. As past SEC Chairman Jay Clayton noted, "Culture is not just what is said by management, but what is done... day in and day out"[4].

The FDIC identified five emerging trends in its 2024 Risk Review[5] for financial institutions that are relevant and impactful to culture and people risk (largely operational risks):

- Cybersecurity (including Encryption Protocols)
- Geopolitical Events
- Quantum Computing
- Supply Chain and Vendor Use
- Artificial Intelligence

Effective management of these threats impacting financial institutions is critical to maintaining stability, ethical integrity, and long-term success. A framework to manage emerging trends constitutes a design that incorporates resilient standards, values, and systems that achieve corporate objectives and goals.

framework for managing culture and people risk

Financial institutions with policies and standards within a framework specific to culture and people risk not only safeguards the firm against reputational and financial harm but also enhances the broader financial ecosystem. The framework for managing culture and people risk identifies four organizational objectives that address the major losses and disruptions impacting financial institutions since 2023 and considers emerging trends:

1. Achieve Governance and Assign Stakeholder Accountability
2. Establish Risk Measures and Monitoring System
3. Assess Culture Immersion (within the organization)
4. Produce Crisis Preparedness and Response Protocols

There are many tools and strategies available to financial leaders to achieve these objectives. Figure 1.0 is a framework to highlight the financial institution's objectives while considering different mechanisms to manage emerging trends that are impactful to culture and people risk:

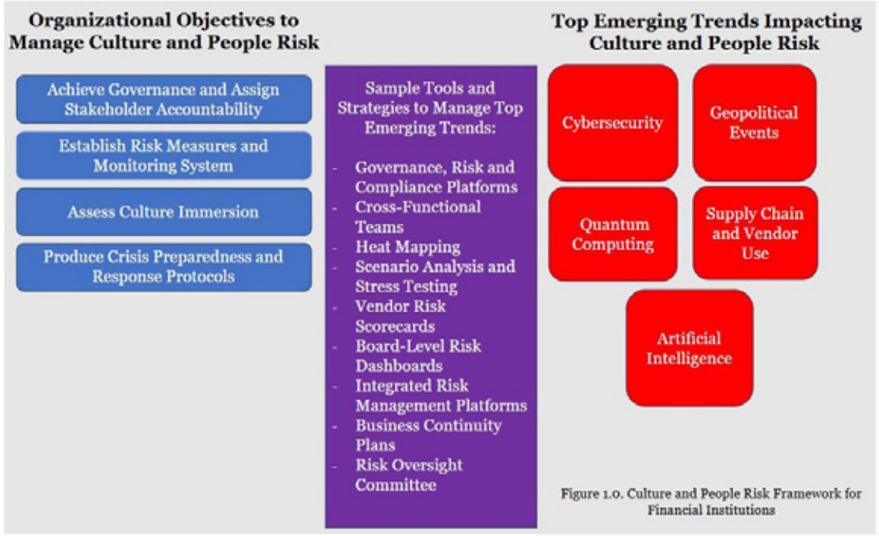

Figure 1.0. Culture and People Risk Framework for Financial Institutions

conclusion

The health of a financial institution is driven by its practices and policies regarding its management of culture and people risk. Situations of misconduct, ethical violations, crimes, and poor oversight have caused billions in losses and fines. Financial institution leaders that embrace proactive risk management policies of responsibility, consistent oversight, and sustainable measurement criteria can mitigate losses and avoid the cultural and people failures of recent years.

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Synopsis

This article offers risk managers practical insights into real-world implementations of both CBDCs and cryptocurrencies, looking at their distinct structures, risk profiles, and lessons learned from global adoption attempts. The question is will they be able to coexist peacefully?

Central bank digital currencies and crypto currencies

by **Shuvajit** Chakraborty

introduction

The digital realm of finance is rapidly evolving, with Central Bank Digital Currencies (CBDCs) and cryptocurrencies emerging as prominent, yet distinct, players. While both exist in the digital sphere, their underlying structures, purposes, and implications diverge significantly, creating a complex landscape for regulators, financial institutions, and the public alike. In this article I present examples of the use of cryptocurrencies (and CBDCs in particular) from a risk manager's perspective, discuss their distinct character, how they performed when attempted, and present the lessons to be learned.

CBDCs and national adoption

Central Bank Digital Currency (CBDC) is a new form of money that exists only in digital form. Instead of printing money, the central bank issues widely accessible digital coins so that digital transactions and transfers become simple[1]. CBDCs are digital versions of a nation's fiat currency, issued and regulated by the central bank. They represent a direct liability of the central bank, akin to physical cash held in reserve. This inherent backing provides CBDCs with the stability and security associated with traditional currency. Their primary objectives include enhancing payment efficiency, promoting financial inclusion, and strengthening monetary policy implementation. For instance, CBDCs can facilitate seamless cross-border transactions, reduce the costs associated with traditional payment systems, and provide access to financial services for unbanked populations. Moreover, they offer central banks a more granular view of monetary flows, enabling more precise policy interventions.

As of July 2025, 3 countries (Bahamas, Jamaica and Nigeria) have launched CBDCs which remain active[2]. Two others (Ecuador and Senegal) have cancelled their CBDCs. While Senegal cancelled its digital currency when the central bank felt that the currency design did not met the regulatory requirements, the Ecuadorian failure of digital currency was spurred by lack of trust from the citizens in their digital currency[3]. 44 countries including Asian powerhouses like China, Japan and India are in pilot stage. In India, fifteen banks are involved in pilot study with both interbank transactions and retail transactions[4].

CBDCs & cryptocurrencies

The technological infrastructure of CBDCs often leverages distributed ledger technology (DLT), though not always in the decentralized manner of cryptocurrencies. Central banks prioritize control and security, often opting for permissioned ledgers that restrict access and maintain centralized oversight. This allows them to mitigate risks associated with volatility and illicit activities. The implementation of CBDCs varies globally, with some countries exploring retail CBDCs for public use, while others focus on wholesale CBDCs for interbank settlements. CBDCs are not only about ensuring speedy payments. They could reduce environmental harm. Studies show that cash dependency has a huge cost—from cutting trees for paper to the fuel used in moving money around. CBDCs can change this and play a significant role in CBDCs environmental sustainability[5].

In contrast, cryptocurrencies are decentralized digital assets that operate on blockchain technology, a form of DLT. They are not issued or regulated by any central authority, and their value is determined by market forces. Bitcoin, Ethereum, and numerous other cryptocurrencies have gained popularity as speculative investments and alternative payment methods. Their decentralized nature offers potential benefits such as censorship resistance, reduced transaction fees, and enhanced privacy. However, these advantages are often accompanied by significant drawbacks.

The volatility of cryptocurrency prices is a major concern. Due to their speculative nature and limited real-world adoption, cryptocurrencies are prone to dramatic price swings, making them unsuitable for everyday transactions. Furthermore, the lack of regulatory oversight creates vulnerabilities to fraud, scams, and money laundering. The lack of intrinsic value and reliance on speculative interest further undermines the safety of crypto-assets as reliable reserve assets for the central banks[6]. The energy-intensive nature of some blockchain technologies, such as Bitcoin's proof-of-work mechanism, also raises environmental concerns. In 2018, Bitcoin was estimated to use at least 40.0 TWh, or possibly up to 62.3 TWh of electrical energy over the full year of 2018. The amount of energy used is comparable to the amount of electricity consumed by countries like Hungary, which used 40.3 TWh[7]. The more recent estimates put the energy consumption of Bitcoin at 94.08 TWh[8], which is more than the annual consumption of Finland.

can they coexist?

The relationship between CBDCs and cryptocurrencies is complex and multifaceted. Some argue that CBDCs could coexist with cryptocurrencies, providing a regulated and stable alternative within the digital asset ecosystem. Others believe that the introduction of CBDCs could diminish the appeal of cryptocurrencies by offering similar benefits in a more secure and regulated environment.

Regulatory frameworks for both CBDCs and cryptocurrencies are still evolving. Central banks and governments are grappling with the challenges of balancing innovation with risk management. The need for clear and consistent regulations is crucial to foster a safe and efficient digital financial system. Key considerations include consumer protection, anti-money laundering measures, and the preservation of financial stability.

The interplay between these two forms of digital currency will likely shape the future of finance. CBDCs represent a potential evolution of traditional monetary systems, while cryptocurrencies challenge the very foundations of those systems. The success of each will depend on their ability to address the needs of users, mitigate risks, and adapt to the rapidly changing technological landscape.

conclusion

In conclusion, while both CBDCs and cryptocurrencies exist in the digital sphere, they embody fundamentally different approaches to finance. CBDCs aim to modernize traditional monetary systems, while cryptocurrencies seek to disrupt them. The ongoing development and adoption of these technologies will have profound implications for the global financial system, requiring careful consideration and proactive regulatory measures. Some of the measures that may be adopted to deal with these are the use of blockchain intelligence, asset research, building of safe storage (both hot and cold wallets) and multiparty computation etc. Above all building institutional capabilities supported with technology will be key to success of digital currencies.

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Synopsis

The rise of financial influencers, or "finfluencers," is reshaping investment behavior, particularly among Gen Z. Finfluencers influence the financial content landscape, offering education, promotions, and investment advice. However, concerns over transparency, misleading information, and unlicensed financial advice persist. Regulators worldwide, including Thailand, are implementing measures to address these challenges, balancing innovation with investor protection.

Assessing disclosure risks in finfluencer marketing: evidence from social media

by **Pongpit** Pinsai & **Sunita** Pengpool

introduction

The emergence of financial influencers, commonly referred to as "finfluencers," has received a lot of attention in recent years, especially as digital platforms continue to reshape the landscape of information dissemination and investment behavior. Finfluencers have become an important source of investment information for young investors, particularly those aged between 18–25, who are part of Generation Z (Gen-Z)[1].

The survey by national regulators such as Financial Industry Regulatory Authority (FINRA) and Australian Securities and Investments Commission (ASIC) shows that 37%, 38% and 64% of Gen-Z in the US, UK, and Australia, respectively, rely on finfluencers when making investment decisions[2,3].

The growing influence is a significant risk to investor protection and financial stability. These risks include the potential dissemination of misleading information, lack of transparency, and unauthorized financial advisory activities, which could lead to adverse consequences for individual investors and the broader market.

In this article, we explain the role and significance of finfluencers, while presenting insights from our study of the Thai finfluencer landscape through content analysis. This examination enhances our understanding of how financial content is communicated to the public in Thailand via finfluencers.

understanding finfluencers

Finfluencers are individuals that can be thought of as a subcategory of social media influencer[4], who leverage social media platforms to share investment-related contents, ranging from general financial education to specific stock recommendations. They often present themselves as experts who share personal experiences, market analysis, and investment tips in an engaging and accessible manner[5].

While finfluencers can play a positive role in enhancing financial literacy and broadening retail investor participation, they also pose numerous of risks to consumer protection and financial stability, such as providing misleading information, lack of transparency in their contents and providing financial services without a regulatory license[6,7]. If investors, particularly retail investors, fail to critically evaluate the content shared by finfluencers, it can potentially lead to suboptimal financial decisions and unanticipated losses.

Example of potential risks that could appear in a finfluencer's post

Misleading information	Lack of transparency	Unauthorized financial services
'Trading in this derivative is a risk-free way to make a quick profit on the side – I made $$$$ from trading these alone!'	Finfluencers may have a hidden incentive to promote financial product.	'I'm going to share with you five long-term stocks that will do well and which you should buy and hold.'
Trading being 'risk free' is likely to be misleading even if the comment about how much money was made could be substantiated. This is **likely to be misleading.**	Not disclosing a conflict of interest can be considered as an indicator of an interest in giving false or misleading signals	Intends to influence someone's decision to buy specific financial products. This is **likely to be financial product advice.** If you don't hold a regulatory license, you are providing unlicensed financial services.

Source: Discussing financial products and services online. Information Sheet 269. (ASIC, 2022) & Warning for people posting Investment Recommendation on social media. (ESMA, 2024)

As the influence of finfluencers continues to grow, it presents challenges for both financial firms and regulators. Firms engaging with finfluencers must ensure compliance with relevant regulations, while authorities in countries such as the United Kingdom, Australia, and India have voiced concerns over unlicensed financial advice, misleading content, and a lack of transparency. These issues raise the risk of market distortions, information asymmetry, and a decline in investor confidence, particularly among retail investors. In response, regulators have begun tightening oversight and enhancing accountability in the digital investment space. The following section highlights examples of regulators' efforts to enforce regulations addressing these concerns.

examples of regulatory enforcement efforts

Several jurisdictions have taken tangible enforcement or policy steps in response to these concerns. In the United Kingdom, the Financial Conduct Authority (FCA) has issued guidance requiring finfluencer content on social media to be clear, fair, and not misleading[8]. Australia's Securities and Investments

Commission (ASIC) emphasizes that providing financial advice without a license constitutes a breach of the law and has issued warnings to influencers accordingly[9]. In India, the Securities and Exchange Board (SEBI) mandates that finfluencers promoting products for registered intermediaries must register with the authority, while allowing unregistered individuals to share general educational content[10]. These actions reflect a growing global consensus that regulatory oversight must evolve alongside digital financial communication to safeguard investor trust and maintain market integrity. The following section illustrates how similar concerns apply to the expanding finfluencer landscape in Thailand.

finfluencers in Thailand

In Thailand, Facebook stands as the predominant social media platform utilized by the local population and influencers in the year 2023[11,12]. In the financial sector, finfluencers also leverage Facebook as a platform to share financial and investment-related content with their followers. This study conducts an analysis of Thai finfluencers on Facebook, as well as the content that they post on the platform. The aims of this study are to provide insights into the landscape of Thai finfluencers, categorize the types of their content, and investigate their potential influence on the stock market.

An analysis of the top 50 Facebook pages, ranked by follower count[13], reveals a hierarchical structure of influence tiers: 4 pages qualify as Mega Finfluencers (more than 1 million followers), 7 pages qualify as Macro Finfluencer (500,001 to 1 million followers), and the remaining 39 pages qualify as Mid-Tier Finfluencers (50,001 and 500,000 followers). Interestingly, the four Mega Finfluencer pages account for around a third (34%) of the total follower base (16.9 million followers). However, it should be noted that individual followers may follow multiple finfluencer pages at the same time, as shown in Figure 1.

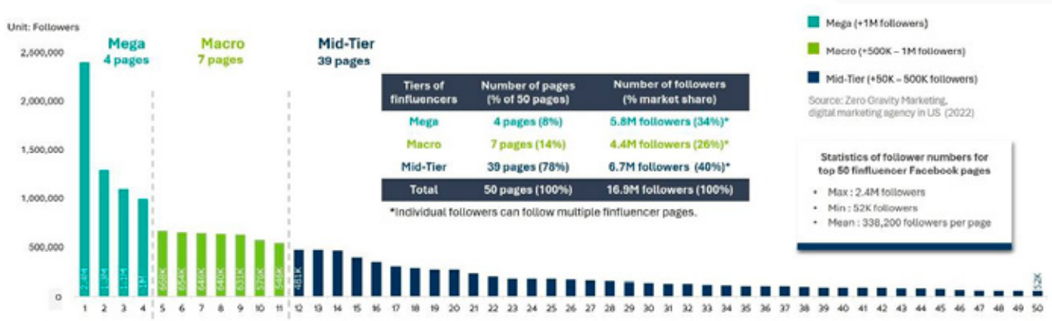

Figure 1. Top 50 Thai finfluencer Facebook pages by follower count (Source: The Securities and Exchange Commission, Thailand)

finfluencers content analysis

The study utilizes web scraping techniques to collect data from finfluencer Facebook pages. This approach allows for the gathering of a comprehensive dataset, including all posts made in 2023 from 3 selected pages selecting the top of each tier ranking by the number of followers including Mega, Macro, and Mid-Tier Finfluencer for content analysis.

The study modified a method from “The Finfluencer appeal: Investing in the age of social media” (CFA, 2024) and incorporated generative AI for content classification. According to 2,949 posts, 4.5 million characters from 3 selected pages, most of the content includes education, news, and discussion about financial topics (57% of posts)[i], advertisements and promotions for financial products or services (23% of posts)[ii], investment advice (14% of posts)[iii], and other content unrelated financial and investment (6% of posts) respectively.

Regulators employ a risk-based approach that places particular emphasis on content related to advertisements or promotions, and investment advice. To examine these regulatory concerns, this study employs keyword analysis and hashtag analysis methodologies to derive comprehensive insights from posts[14].

For advertisements and promotional content (total of 674 posts), we categorized various marketing forms into 4 categories: direct communication in promotional objective, tie-ins, comment inserts and affiliate links. 397 of the posts (59%) did not contain marketing disclosures, as shown in Figure 2. This raises concerns for a hidden marketing agenda.

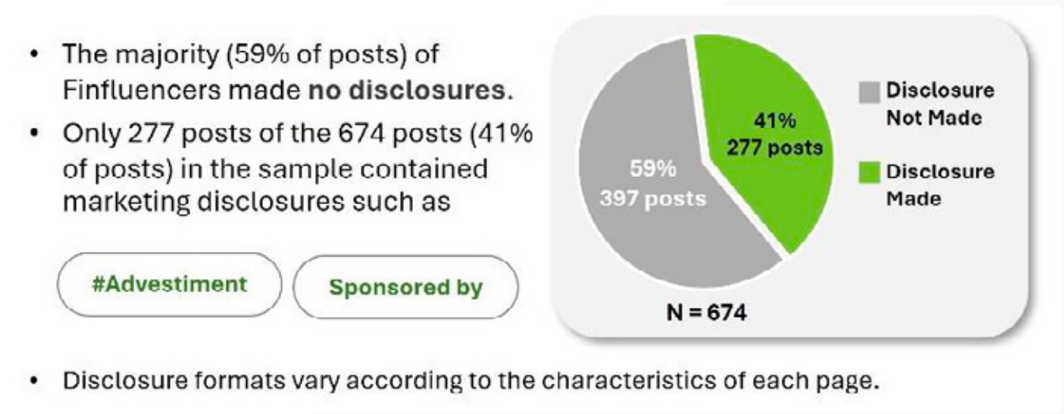

Figure 2. Proportion of advertisements and promotional content that contains marketing disclosures (Source: The Securities and Exchange Commission, Thailand)

i Education, news, and discussion about financial topics which does not recommend a specific course of action, such as what to buy. It may provide general information about different types of investments or general principles to consider before investing. (CFA, 2024)
ii Advertisements and promotions for financial products or services is an invitation or inducement to engage in investment activity or to engage in claims management activity that is communicated in the course of business. (FCA, 2024)
iii Investment advice is an information recommending an investment strategy, explicitly or implicitly, concerning one or several financial instruments or the issuers, including any opinion as to the present or future value or price of such instruments. (ESMA, 2021)

For investment advice content for a total of 416 posts, the study found that 84% of investment advice content (348 posts) recommended investment strategies, while 16% of investment advice content (68 posts) suggested investment in specific securities as shown in Figure 3. This raises a concern about inadequate level of expertise of finfluencer, misleading of information, and providing financial services without a license.

Proportion of investment advice content type

Figure 3. Proportion of investment advice content type (Source: The Securities and Exchange Commission, Thailand)

While presenting insights from our study of the Thai finfluencer landscape, we adapted the event study methodology from Oosting (2022) to examine investment advice which suggested investment in specific securities. Our analysis identified mentions of 56 Thai stocks across 75 events in the posts. The results indicate that although there were fluctuations in abnormal returns within a five-trading-day window before and after the events, there was no consistent evidence that these events had a significant impact on returns, either positive or negative. This lack of significant findings may be attributed to limitations in the sample, which included only a selection of Facebook pages.

conclusion

The emergence of finfluencers has transformed how financial information is distributed and has influenced investor behavior, particularly among younger investors who rely on finfluencers as a source of financial information. While finfluencers enhance financial literacy and retail investor participation, the risks they pose—misleading information, lack of transparency, and unlicensed activities—cannot be ignored.

Through comprehensive content analysis utilizing generative AI of 3 finfluencer Facebook pages from the top of each tier ranking by followers, reveals that their educational contents, promotional contents, and investment advice contents account for 60%, 23%, and 14% of their total content respectively. While Finfluencers enhance financial literacy and retail investor participation, there is still room for improvement for increasing transparency in certain areas. This presents a notable challenge for regulatory bodies and calls for collaboration among regulators, social media platforms, and financial firms to balance between leveraging the benefits of finfluencer participation in financial and capital markets while maintaining appropriate investor protection measures.

Disclaimer: The authors used AI tools for grammar checking and language refinement during the writing process.

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Synopsis

This article presents a comprehensive framework for AI governance, emphasizing responsible, ethical, and risk-based adoption of AI systems. The framework integrates organizational policies, management systems, and operational practices to ensure the safe, trustworthy, and compliant deployment of AI. The authors advocate for a governance approach that balances innovation with robust controls, enabling organizations to harness the benefits of AI while safeguarding stakeholders and maintaining trust in a rapidly evolving technological landscape.

Governance of AI systems: ensuring safe and trustworthy AI systems

by **Martin** Leo & **Peck** Thian Guan

introduction

Artificial intelligence (AI) systems are being developed, deployed, and used at increasing speeds across industries and regions. A 2025 McKinsey survey shows that more than three-quarters of organizations surveyed are using AI in at least one business function, particularly with the rapid use of generative AI increasing[1].

While AI is proving to be a transformative technology that revolutionizes various aspects of our lives, it has also raised significant concerns regarding the potential to propagate risks. This technology comes with inherent dangers such as bias, inaccurate and misleading information, data privacy breaches, and copyright infringement. The models are prone to errors resulting from flawed data inputs, insufficient oversight, or structural deficiencies in decision-making algorithms—issues that are often opaque to those deploying the technology. In the absence of adequate governance mechanisms, AI systems can be integrated into a decision-making process that results in adverse outcomes, inequities, or regulatory breaches.

Ensuring that AI systems achieve their intended purposes while safeguarding all stakeholders from potential risks requires a comprehensive governance strategy. A well-established governance framework provides structured oversight and accountability for AI usage, thus ensuring trustworthy AI systems that are valid and reliable, safe, secure, and resilient, accountable and transparent, explainable and interpretable, privacy-enhanced, and fair with harmful bias managed[2].

framework for governance of AI systems

An AI governance framework can be conceptualized as comprising three primary layers:

- Policy
- Management System
- Practices

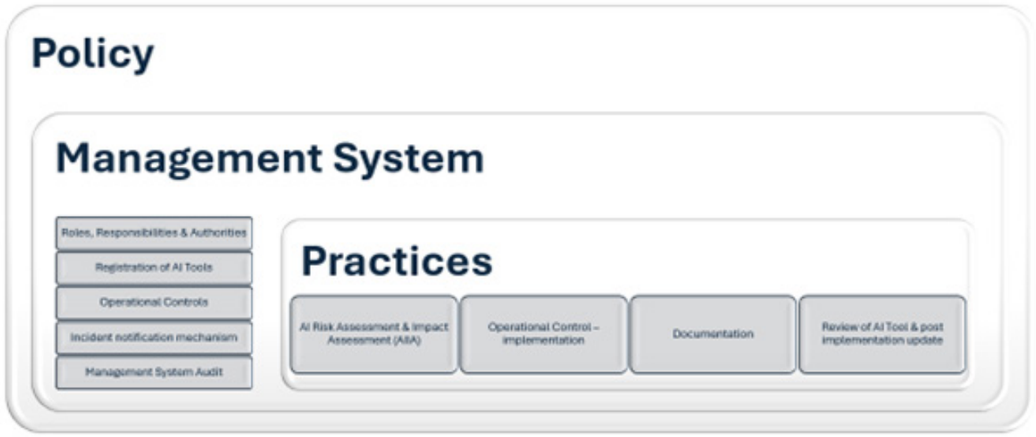

Figure 1. AI Governance Framework

Policy

The AI policy as a foundation mandates the principles to ensure AI will be developed, deployed, and used in alignment with the organization's values, stakeholder expectations, and regulatory requirements. The policy is drafted considering the organization's stakeholders, products, services, and processes, and specifying directives on critical areas like safety, data privacy, fairness, and ethics to ensure compliance with local and international regulations. The policy must define roles, responsibilities, and organizational authorities to ensure clear accountability throughout the AI lifecycle.

Management System

The management system component embeds AI risk management into the organization's infrastructure. It includes the mechanisms, tools, and structures needed to support governance processes and ensure AI technologies operate in accordance with organizational policies.

- **Oversight Committee:** An AI Oversight Committee provides governance over AI systems, defining principles, overseeing risk mitigation, and ensuring ethical standards while balancing innovation and risk.

> **Box 1: AI Oversight Committee**
>
> To be effective, the committee must bring together a diverse group of members, including:
>
> - Business leaders and those representing internal and external stakeholders
> - Legal, compliance, and ethics professionals
> - Experts in AI technologies, safety, and deployment risks
>
> Membership should span the three lines of defense including business and control functions (e.g., HR, IT, Operations, Risk, Legal). The committee is responsible for:
>
> - Reviewing AI initiatives with significant stakeholder impact
> - Evaluating whether certain high-risk or inappropriate uses of AI should proceed
> - Requiring clear mitigation strategies before approving deployment of impactful systems

- **System Registration:** AI systems should be registered in an inventory that enables accountability and assurance, similar to model risk management practices.

- **AI Impact & Risk Assessment (AIRA):** All AI systems should be assessed at the concept stage to evaluate their impact on stakeholders (clients, employees, communities, nature) to identify any potential adverse outcomes (Figure 2). For example, can an AI hiring system unfairly impact qualified applicants (by gender, race) due to limited training data? This is followed by a risk assessment to evaluate risks and control adequacy.

Practices

The practices component of AI governance is essential for bridging the gap between policy intent and practical application, ensuring that governance objectives are fulfilled at the operational level. Some of the practices that should be implemented:

Model management

- Use sandbox environments for model design and research.
- Document model design and selection criteria.
- Regularly validate continuously retrained models.
- Review outputs against criteria when explainability is mandated.
- Monitor for data and model drift
- Manage model versions for traceability and reproducibility.

Decision making systems

- Any human-out-of-the-loop decision-making systems (operate autonomously, without the need for human guidance/intervention), and assessed with major/extreme impact, should undergo rigorous testing and have built in trails for traceability.
- All extreme impact systems should have a tested “failsafe” (system defaults to a safe state if it encounters an error, preventing harm) capability and have a “kill switch” (ability to shut down the system, preventing harm if the AI behaves unpredictably/maliciously). This is key to ensuring no life being harmed by an AI system[3].

AI in acquired systems

- The framework should be applied to systems that are acquired and/or to third-party systems (e.g. SaaS, supplier system) that embed AI capabilities.
- The assessment should also include an evaluation of the provider’s AI governance practices.
- Terms of use and legal liabilities related to the use of these systems and their data should be clarified and outlined in the contractual agreement documents.
- Notably, there should be clarity on the ownership and consent for usage of the data when using 3rd third-party systems (e.g. LLMs).

Testing, Evaluation, Verification and Validation (TEVV)

- AI systems must be tested to validate the model for quality aspects such as robustness, bias, fairness, representation, reliability, and accuracy, before deployment in production systems.
- Testing should be done using scenarios similar to deployment conditions.
- Systems with higher impact should be tested by an independent third party.

Deployment

- When deploying the system outside of a test or sandbox environment and into production for operational use, formal approval must be obtained from a change control board or the oversight committee.

Monitoring

- Regular reviews and post-implementation evaluations are necessary to assess the effectiveness of the AI systems (& models) in meeting their intended objectives and their adherence to ethical and regulatory standards. This is to check that the system’s accuracy and overall behaviour do not deteriorate in a real-world setup.

- Review frequency should align with the system's usage (e.g., transactional frequency) and impact (e.g., high-risk systems) and include metrics to measure accuracy, bias, drift, data quality, fairness, privacy, technical vulnerabilities, performance anomalies, etc.
- Monitoring should be proactive with real-time AI performance tracking to detect anomalies, identify improvements, and ensure responsible operation effectively.

Decommissioning

- AI systems should be decommissioned when they no longer meet objectives, with stakeholder impact assessed. Data must be archived or securely disposed of as per regulations, and a backup retained for future investigations.

conclusion

A few aspects to be mindful of:

1. Unlikely to get it all perfect at the start: Document the policy to set the expectations and allow time for requirements aspects to be understood and implemented across the organisation, including a feedback mechanism.
2. Revise and retrain: Given the pace of technological advancement, the framework should be agile and allow for quick changes and revisions to the policy and associated documents. This should be supported by guidance and awareness for all parts of the organization.
3. Enable, not entangle: The oversight committee plays a crucial role in socializing the need for AI governance, actively working across the organization to achieve oversight and enabling the adoption of “trusted” technology.

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Synopsis

Risk-neutral valuation is a cornerstone of modern derivatives pricing, shaping how financial institutions value options and complex structured products. An intuitive grasp of this concept is crucial for practitioners to recognize the difference between how financial instruments are valued and how their risks are managed.

An intuitive introduction to risk-neutral valuation

by dr. **Eric** Tham

introduction

One of the more abstract topics in derivatives pricing is the concept of risk-neutral valuation. Risk-neutral valuation is a fundamental concept that underpins all option pricing formulae including the famed Black-Scholes-Merton formula. It is fair to say this formula gave birth to the entire derivatives and structured products industry which notional has grown to more than USD 600 trillion in 2024 according to the Bank of International Settlements[1] in the figure below. In comparison the world GDP is 106 trillion in 2023.

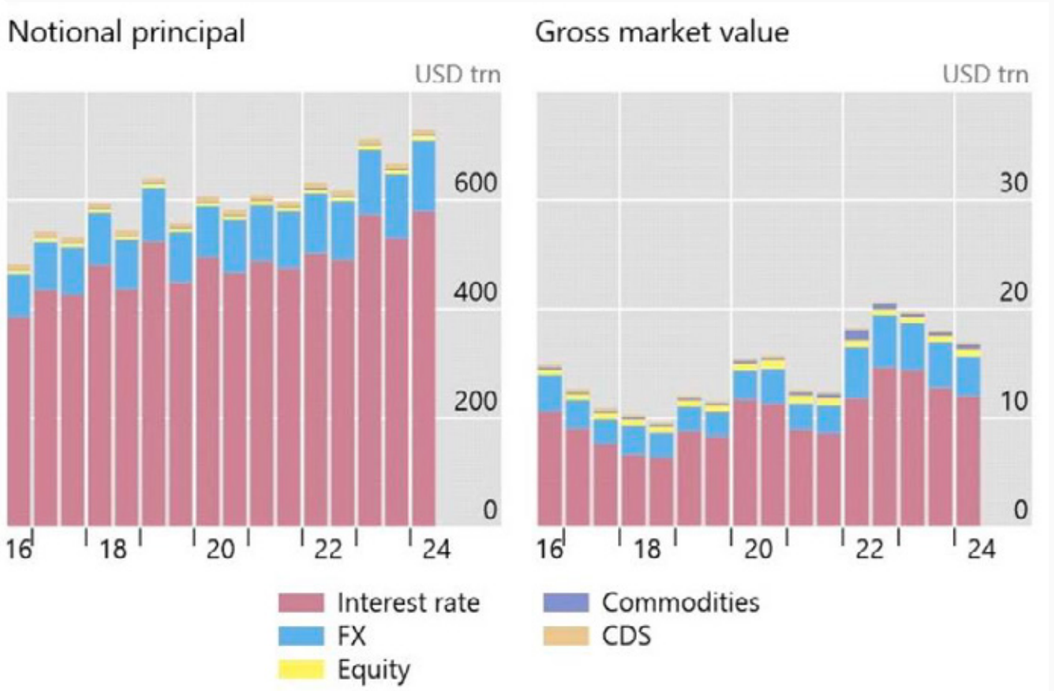

Figure 1. Total notional principal of derivatives worldwide (source: Bank of International Settlements, 2024)

Most learners in the field are taught to replace the expected return of the underlying asset with the risk-free rate in the option pricing formula, without fully understanding why. Understanding this concept would enhance the practitioner's understanding and why the risk-free rate is used for derivatives pricing and not in say risk management.

What does risk-neutral valuation mean exactly for that matter? In this short article, we explain this in a novel manner.

Suppose a risky asset that pays off in a year $100 with probability p=90% and -$800 with probability 1-p. Its expected payoffs are:

$$\boldsymbol{E}[Payoffs] = 100 * p - 800 * (1 - p) = \$10 \qquad (1)$$

But would you pay $10 for it? Most are risk-averse to losing $800 and would not. Further, how do we consider time discounting? In corporate valuation, risky cash flows are discounted by adding a risk premium to the risk-free rate if the investor is risk-averse or a risk discount rate if the investor is risk-seeking. Denote the premium as rp and the risk-free rate as rf.

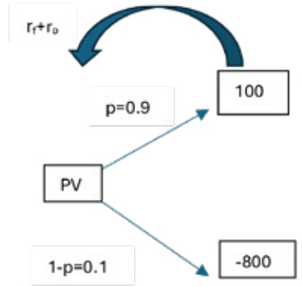

Figure 2. Real-life probability measure *P*

The present value (PV) of the asset with continuous compounding is:

$$\text{PV} = \exp[-(r_f + r_p)T] * [100 * p - 800 * (1 - p)] \qquad (2)$$

Assuming for an investor rp = 3% and rf = 5%, the PV works out to $9.23. The higher the risk premium the more depressed the present value is. For example in a recession, markets become more risk averse. Investors require a larger risk premium which depresses equity prices.

Arbitrageurs could sell to the risk-seeking at a higher price and buy fro the risk-averse investor at a lower price, assuming a frictionless market. How is a price then determined? It should be at a price* perceived fair *to all investors.

The earlier example pre-supposes the investor is risk-averse with a risk premium of 3%. However, there could be a spectrum of risk-aversion in the market requiring different premia and even risk-seeking investors paying a discount.

no-arbitrage and replication

This is where no-arbitrage and replication come in. Arbitrageurs could sell to the risk-seeking at a higher price and buy from the risk-averse investor at a lower price, assuming a frictionless market. How is a price then determined? It should be at a price perceived fair to all investors. This perception is engrained in the Expectations ***E*** in Equation (1) or beliefs of the investor. Instead of accounting for the risk aversion of the investors, one could adjust their beliefs (of the asset going up or down in price).

The asset being a derivative can be replicated exactly from a portfolio of the underlying and a risk-free cash deposit. This exact replication means the asset and its *replicated portfolio* must have the same returns. Not having the same returns would allow one to arbitrage by selling the over-valued and buying

the under-valued one, as pictured below.

Figure 3. No-arbitrage and perfect replicability make the asset return risk-free

By going long the replicated portfolio and short the asset, the difference would be obtained – the risk-free rate. Otherwise, if the expected return is higher, one can hedge perfectly using the replicated portfolio and be guaranteed of a risk-free profit. If the expected return is lower, the asset would not attract investors. This is a general principle that all perfectly replicable derivatives must earn the risk-free rate under no-arbitrage conditions. Another major advantage of using the risk-free rate is that it is observable in the markets – unlike the differing risk premium amongst investors which would make pricing almost impossible.

Using the risk-free rate of return and conforming the PV still at $9.23, then q = 0.8996 < p = 0.9, as shown below. This is the Q measure and ubiquitously the risk-neutral probability whereas P is the real probability measure.

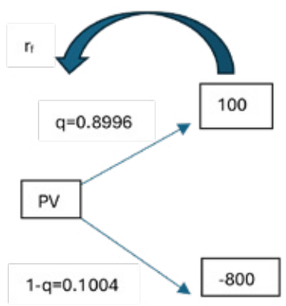

Figure 4. Risk-neutral probability measure ***Q***

For the risk-averse investor with risk premium = 3%, he perceives the increased chance of losing $800 with an increased probability of 0.04%. Importantly, he still values the asset the same as the risk-neutral investor. This can be generalised to other investors with different risk aversions. Risk-neutral valuation thence values the risky asset for investors indifferent to risk.

conclusion

This short exposition expounds the risk-neutral valuation as a relationship between risk aversion and risk-free rate discounting and sheds some light on this important yet abstract concept.

appendix: Girsanov Theorem

This change in the probability from ***P*** to ***Q*** is framed as the Girsanov theorem in stochastic calculus. Under this theorem, the ***P*** probabilities are multiplied by the Radon Nikodyn derivative ***dQ / dP*** to obtain the ***Q*** probability measure.

$$\text{PV} = \exp\left[-r_f T\right] * [p * 100 + (1-p) * -800] * \frac{dQ}{dP} \qquad (4)$$

Equating (3) and (4), the Radon Nikodym derivative ***dQ / dP = 7q-8 / 7p-8*** would then be dependent on existing probability measures.

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Dr. Eric Tham is a senior lecturer with the Finance division at Nanyang Business School. Eric has diverse research interests spanning climate and commodities finance, AI/ML in financial and household finance. Prior to this, he worked in the financial services in risk, quantitative analysis and energy economics with banks and an oil major for 16 years. He holds a MS Financial Engineering from Columbia University, MS Business Analytics from NUS and a PhD in Finance from EDHEC. He has presented in the AFA 2020 annual meeting, the Miami Behavioural Finance meetings and the Australasian Banking and Finance conference.

Synopsis

This article outlines real estate trends such as declining commercial valuations and shifting housing demand due to remote work. Risk practitioners will learn about the key risk drivers currently affecting property portfolios, including the impacts of climate-related threats. A case study about the UK real estate company Landsec provides practical insights.

The evolving real estate landscape: practical implications for risk managers

by **Subhojit** Dasgupta

introduction

The real estate market, a cornerstone of global economic activity, faces a plethora of challenges that demand sophisticated risk management strategies. This article examines the current risk landscape in both residential (such as single family, condos) and commercial real estate (such as office, retail, hotel) sectors with a focus on emerging trends, data-driven insights, and practical implications for risk managers.

current state of real estate risks

Recent data indicates a complex risk environment for real estate investors and risk management professionals. The commercial real estate (CRE) sector, in particular, is grappling with significant headwinds. Capital Economics projects a 10% decline in CRE valuations in 2024, followed by an additional 5% drop in 2025, signaling a correction from pandemic-era peaks[1]. This downturn is attributed to various factors, including changing work patterns, evolving consumer behaviors, and macroeconomic pressures.

In the residential sector, risks are equally pronounced. The rise of remote work has reshaped housing demand patterns, while affordability concerns persist in many markets. These shifts necessitate a reevaluation of traditional risk assessment models[2].

emerging risk factors

Climate-related Risks

Our planet's climate is constantly changing, and human activities are now accelerating these shifts. Climate change refers to significant and long-term changes in global weather patterns, including rising global temperatures, more frequent extreme weather events, and sea-level rise.

For real estate assets around the globe, these changes pose an increasingly significant threat. Properties are becoming more vulnerable to physical risks such as:

- Increased flooding: From heavier rainfall and rising sea levels.
- Intensified storms: Leading to wind damage and storm surges.
- Extreme heat: Stressing infrastructure and increasing energy costs.
- Wildfires: Especially in fire-prone regions.

One groundbreaking study highlights the immediate and growing danger. Utilizing high-precision flood risk modeling, it revealed that 729,999 retail, office, and multi-unit residential properties in the contiguous United States are currently at risk of annualized flood damage. This number is projected to grow annually by 8% over the next 30 years due to accelerating climate change impacts. The associated structural damage is expected to increase from USD $13.5 billion annually to USD $16.9 billion over the same period[3].

Financial and Market Risks

The financial landscape for real estate is becoming more complex. Research indicates that large U.S. banks may be underestimating their CRE risks when considering only direct balance sheet exposures. A recent study found that factoring in Real Estate Investment Trust (REIT) credit lines more than doubles CRE exposure for the nine largest U.S. banks[4]. In a rising interest rate environment, the heightened wrong-way risk—driven by declining values of pledged collateral and increased drawdowns—could significantly impact the stability of both the broader financial system and the real estate market.

Technological Disruption

Technological innovation is rapidly reshaping CRE, introducing both significant opportunities and notable risks that directly impact market stability. The advent of smart buildings, leveraging Artificial Intelligence (AI) and the Internet of Things (IoT), offers substantial operational gains, including enhanced energy efficiency, predictive maintenance, and optimized space utilization, leading to lower operating costs and improved tenant experiences. These advancements are becoming increasingly central to competitive advantage in the modern CRE landscape.

However, this increased connectivity introduces a critical vulnerability: cyber risk. With building systems like HVAC, access controls, and surveillance becoming intricately linked to networks, a successful cyber breach can have severe consequences beyond just data theft. It can lead to the disabling of essential building functions, unauthorized access to secure areas, or compromise of surveillance systems, thereby creating significant safety hazards for occupants and exposing property owners to substantial liability. The integration of physical and digital systems means

CRE assets face an increasing threat from cyber-physical attacks, where digital intrusions directly manipulate or disrupt physical infrastructure.

Most critically, the rapid pace of technological change means that older buildings face significant technological obsolescence. Properties not equipped with smart infrastructure or lacking modern digital capabilities risk considerable tenant attrition, as corporate occupiers increasingly prioritize tech-enabled environments. According to JLL (2024), over 70% of corporate tenants now expect and demand advanced technological features in their leased spaces. This places immense pressure on legacy assets to undertake costly modernizations or face declining rents, reduced competitiveness, and ultimately, devaluation within the market. This divergence in technological readiness creates a widening gap, contributing to instability and bifurcation in the CRE market.

In short, as CRE becomes more digitized, tech-related disruptions are no longer abstract threats—they directly impact asset value, operational continuity, and market confidence[5].

practical implications for risk managers in commercial real estate

To effectively navigate the evolving risk landscape driven by technology, climate change, and shifting market dynamics, risk managers must adopt a forward-looking and integrated approach:

- Enhanced Due Diligence: Strengthen due diligence by evaluating not just traditional financials, but also property-level climate risk, technological infrastructure readiness (e.g., smart building systems), and cybersecurity posture of real estate assets.
- Dynamic Portfolio Management: Use agile portfolio strategies that respond to real estate-specific trends such as ESG mandates, tenant demand for digital amenities, and regulatory changes impacting property operations.
- Stress Testing & Scenario Analysis: Build CRE-specific models that simulate shocks such as climate-related damage to assets, ransomware attacks on building systems, or market volatility in rent and occupancy.
- Interdisciplinary Collaboration: Collaborate across teams—property managers, real estate finance professionals, climate scientists, and data analysts—to build more robust and context-aware risk models.
- Continuous Learning & Market Awareness: Engage with real estate-focused risk networks, certifications (e.g., RICS, ULI, GRESB), and research to stay ahead of technological, environmental, and tenant-driven disruptions.

See *Appendix* for a case study incorporating elements of real estate risks, their assessment, and follow-up actions described herein.

conclusion

The real estate risk landscape is evolving at an unprecedented pace, driven by climate change, technological advancements, and shifting market dynamics. Risk managers must adapt their strategies to address these complex challenges effectively.

As the sector continues to transform, further research into the long-term impacts of climate change, the role of technology in risk mitigation, and the effectiveness of new risk assessment models will be crucial. The ability to anticipate and manage these evolving risks will be a key differentiator for successful real estate professionals in the coming years.

Disclaimer: The author used GenAI in the research and editing phase of this article.

appendix: Landsec's climate and technology risk management in real estate[6]

Landsec, one of the largest real estate companies in the UK, provides a compelling real-world example that aligns closely with the themes and recommendations in this paper. Facing the dual challenges of climate change and technological disruption, Landsec undertook a comprehensive overhaul of its risk management strategy to address the evolving risk landscape in both its commercial and residential portfolios.

Background

Landsec's portfolio includes a mix of office, retail, and residential properties, making it highly exposed to climate-related risks (such as flooding and extreme weather), shifting tenant demands, and technological changes. Recognizing these threats, Landsec committed to adopting the Task Force on Climate-related Financial Disclosures (TCFD) framework, aiming to bring greater transparency and resilience to its operations.

Actions Taken

- Climate Risk Assessment and Scenario Analysis:
  Landsec conducted a two-year research initiative involving sustainability, finance, and insurance teams to quantitatively and qualitatively assess climate risks across its portfolio. This included forward-looking scenario analysis to understand how climate change could impact asset values, operational costs, and tenant demand.

- Integration into Investment Decisions:
  The company embedded climate risk data into its property investment, development, and divestment decisions. For example, they adapted building services to manage higher cooling costs and reduced heating demand, directly responding to the types of climate-driven operational risks highlighted in this paper.

- Financial Reporting and Transparency:
  Landsec began disclosing climate risk metrics in its annual reports, providing investors with clear, actionable insights into the financial implications of climate-related risks. This transparency aligns with this paper's emphasis on data-driven risk management and comprehensive analytics.

- Technological Modernization and Cybersecurity:
  In response to the growing threat of technological obsolescence and cyber-physical attacks, Landsec prioritized upgrading building management systems and enhancing cybersecurity protocols—mirroring the need for risk managers to address tech-driven vulnerabilities as described in this paper.

Outcomes

- Resilience and Value Protection:
  By proactively addressing climate and technology risks, Landsec has improved the resilience of its portfolio, maintained tenant satisfaction, and protected long-term asset value. Their approach has already generated positive financial outcomes and positioned the company as an industry leader in risk-informed decision-making.

- Industry Leadership:
  Landsec's commitment to early action and transparent reporting has set a benchmark for the real estate sector, demonstrating how integrated, forward-looking risk management can drive both financial performance and stakeholder confidence.

Synthesis

This case study demonstrates how the adoption of advanced risk assessment techniques, comprehensive data analytics, and proactive management strategies—core recommendations of this paper—can materially improve the resilience and performance of real estate portfolios in a rapidly changing risk environment.

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Subhojit is an Executive Director at JPMorgan Chase & Co., with 7 years at the firm. He leads allowance and stress testing data preparation, advanced data analytics, and model execution for wholesale credit risk portfolios. Subhojit ensures regulatory compliance and risk reporting, with a strong focus on data governance. He has a special interest in commercial real estate portfolios and the risks inherent in them. Previously, he was a Senior Consultant at EY for 5+ years, advising top Wall Street banks on stress testing, Basel, and Dodd-Frank mandates. Subhojit is also a mentor to junior professionals pursuing careers in risk management and data analytics.

peer-reviewed by

Chandrakant Maheshwari

Synopsis

GenAI's promise is hard to take seriously given the number of people it will supposedly replace. At the same time, its capabilities to do the unnoticed, repetitive work we all dread is being underestimated. Chandrakant Maheshwari, who presented to a PRMIA audience on this topic recently, sat down with your editors for a brief follow up about LLMs in compliance.

Trust before scale: introducing LLMs to compliance, one safe step at a time

based on a webinar by **Chandrakant** Maheshwari

introduction

In a recent PRMIA webinar titled "Trust Before Scale: The Small Wins Approach to LLMs," Chandrakant Maheshwari outlined a structured framework for introducing Large Language Models (LLMs) into the regulated domain of financial compliance. The approach emphasizes limited-scope, repeatable use cases that support operational reliability and regulatory defensibility. Based on implementation experience across banking and advisory contexts, the framework addresses emerging risks in GenAI deployment by prioritizing control and explainability over speed of adoption.

Rather than advancing broad automation strategies, the focus is on narrowly defined tasks that address specific pain points, require no judgment substitution, and remain auditable. This discussion builds on the webinar by examining how incremental, deterministic applications of GenAI can be incorporated into compliance workflows while maintaining alignment with supervisory expectations.

When Excel was introduced, it wasn't revolutionary because of its underlying technology. It became indispensable because it helped users automate calculations and clean data immediately without needing to ask IT for help.

LLMs, if introduced responsibly, can do the same.

Intelligent Risk: So where do LLMs belong in compliance workflows today?

Chandrakant Maheshwari: Start at the bottom of the risk pyramid.

There's no shortage of repetitive, resource-heavy, low-judgment tasks in compliance. Think address parsing: many institutions still store legacy customer address data in unstructured blobs. Parsing those into structured fields (i.e., Address Line 1, City, Zip Code) is tedious for analysts but ideal for a local LLM. No judgment involved, just parsing.

Another great example: document segmentation. Compliance teams sit on decades of historical memos, policies, and audit letters. These documents are rich in institutional knowledge but buried in chaotic folder structures. An LLM can tag, chunk, and organize them into labeled sections "KYC escalation," "EDD criteria," etc., making them instantly searchable.

These use cases don't require creativity or decision-making. They require structure. And structure is where LLMs can shine safely.

IR: You've said LLMs might become "the new Excel" in compliance. What does that mean?

CM: When Excel was introduced, it wasn't revolutionary because of its underlying technology. It became indispensable because it helped users automate calculations and clean data immediately without needing to ask IT for help.

LLMs, if introduced responsibly, can do the same.

If a compliance analyst can use a local LLM to convert a messy audit memo into structured bullet points or tag 300 pages of regulatory text into usable references, that's an "Excel moment." No boardroom pitch. No leap of faith. Just usefulness.

But this only happens when LLMs are applied to problems people already understand and when they perform that task with speed, accuracy, and full audit traceability.

IR: What about concerns over data privacy and unpredictable behavior?

CM: You don't dismiss them, you design around them.

This is why I emphasize local, lightweight models like Mistral or TinyLlama. These models can run entirely offline, without any cloud exposure. If you're parsing PDFs or segmenting legacy policy docs, there's no reason to send data to OpenAI or Hugging Face. Keep it local. Keep it logged. Keep it explainable.

And again, no decisions. LLMs in compliance should not replace the analyst; they should support them. That means no autonomous memo generation, no SAR recommendations, no alert scoring. Assistive, not authoritative. That's the key.

IR: What kind of structure helps ensure LLMs are governed appropriately in compliance?

CM: Think of LLMs like junior analysts. You wouldn't let an intern work unsupervised; same rule applies here.

Every deployment should be documented, versioned, and monitored. We're seeing the rise of "model cards" and "use case sheets," internal documents that explain exactly what the model does, and what data it does and does not touch. Prompts should be version-controlled like code. Outputs should be stored with timestamps and linked to inputs.

More importantly, involve the three lines of defense:

- Frontline compliance should own deployment and escalation workflows.
- Risk teams should validate the model design.
- Audit should review usage logs and test repeatability.

That's how you build cross-functional trust. Not with clever demos, but with process maturity.

IR: What's your advice to early-career professionals trying to break into GenAI in compliance?

CM: Don't chase the most complex solution. Chase the most useful one.

The best way to break into this space is to understand why compliance operates the way it does. Learn the value of explainability. Study how model governance works. Then pick a small pain point, say, helping parse SAR narratives or auto-tagging case memos and show you can solve it well.

Remember: you're not trying to be the smartest person in the room. You're trying to be the most helpful. And helpfulness, when delivered at scale and with structure is what builds credibility in compliance.

IR: What's next for this space and where do you see the real frontier?

CM: The next big step isn't technical, it's cultural.

We need to shift the conversation from "can LLMs replace compliance analysts?" to "how can LLMs reduce the operational burden so analysts can focus on judgment and escalation?"

The real promise of GenAI in compliance isn't automation. It's liberation. Freeing humans from copy-paste work. From digging through 300-page regulatory PDFs. From reformatting memos for the fifth time.

That's why I titled the talk Trust Before Scale. When teams experience even one "small win": a model that segments documents correctly, tags memos usefully, or saves two hours a day, trust begins to build. And when trust builds, adoption follows.

It won't happen overnight. But in three years, the most successful compliance teams won't be the ones who deployed the most models. They'll be the ones who deployed them best.

Want to hear the full conversation?

Watch the webinar replay: RECORDED: Trust Before Scale: The Small Wins Approach to LLMs

presenter

Chandrakant Maheshwari

Chandrakant Maheshwari is a senior model validation leader at Flagstar Bank, with over two decades of experience in quantitative risk, compliance, and financial crime analytics. He has led enterprise initiatives across AML, surveillance, and regulatory technology domains, and is currently focused on the governance and validation of Generative AI systems in regulated financial environments.

Chandrakant is the author of two forthcoming books on model risk and financial crime model validation (Elsevier and Springer, 2026) and serves on multiple advisory boards in the RegTech and AI policy space.

Synopsis

This article takes a light-hearted look at what sets apart organisations who manage risk well, and points out the key tenants of a truly effective risk culture – through the medium of Monty Python.

The Holy Grail of a self-sustaining risk culture

by **Aoife** Mansfield

"Bring out yer dead!...I can't take him like that. It's against regulations"

Organisations that are smart about risk management understand that embedding the right culture across all business lines is critical to balancing the 'cost of control.'

Scaling businesses do not have the time nor the resources to slow down for rework. Time to market is critical, and a key enabler for pace is ensuring that all requirements are accurate and complete - both at the point of design, and appropriate intervals thereafter.

In practice, this looks like a true partnership between lines - resulting in a skilled and supported first line, that is just as comfortable navigating key regulatory requirements for the activities it performs, as it is running the operation of the firm's products and services. This way, first line teams are not over-burdened, nor is there a default to regulation being a second line problem - or worse still, a blocker to delivery.

Organisations that are smart about risk management understand that embedding the right culture across all business lines is critical to balancing the 'cost of control' – compliance is not an after-thought, because they've learned that this drives inefficiency.

And for those who don't crack the culture equation? Well, there's little more painful than trying to reverse-engineer regulatory requirements into a product that was seemingly ready to launch. That is, other than launching it, and finding out the hard way why those requirements are mandatory in the first place.

The most obvious (and frequent) indicator that an organisation hasn't got that balance right is an over-reliance on one-size-fits-all training - with no other meaningful support to upskill first line teams.

2. "Every time I try to talk to someone it's 'sorry this' and 'forgive me that'..."

A great second line acts as a trusted, challenging advisor – with a working relationship built on earned, mutual respect.

Well-intentioned efforts to preserve second line independence can lead to a flawed working relationship with first line. Over the years, I've had to remind teams to look at the sign over the door on the building they're entering - no regulator has ever required the price of independence to be a commercial mindset.

Anyone who has spent any length of time in financial services can attest to what an ineffective working relationship with Risk & Compliance looks like - mutterings about 'business prevention units' abound, urgent requests are flung over the metaphorical hedge at the eleventh hour, and interactions bear the hallmarks of weariness and resentment. First line teams feel as if they are constantly told off, and second line feels like the pal never invited to the party.

A great second line acts as a trusted, challenging advisor - with a working relationship built on earned, mutual respect. There is no infantilisation of first line, second line is not treated as an obstacle - and the mantra that underpins that relationship? 'No surprises' - which cuts in both directions.

3. "[God]: 'Course it's a good idea!"

Nothing stifles a positive risk culture faster than the inability to disagree. When undertaking effectiveness reviews for boards or executive committees, a key step should always be reviewing materials for evidence of challenge. Not only in terms of frequency, but response - are dissenting voices heard, or dispatched without debate?

Echo chambers cause accidents, and senior executives are not infallible - people at all levels of the organisation must have a genuine ability to ask questions.

3. “Your arm’s off!”
“No, it isn’t ... it’s just a flesh wound”

Transparency is critical. If the worst happens, how your organisation responds will be just as important as what went wrong in the first place - including the systems of review that kick in once the dust has cleared.

The most effective post-event reviews are led with curiosity and firmly structured around the opportunities for control enhancements - less ‘Colonel Mustard, in the library, with a lead pipe’, more ‘the amount of weaponry lying around this mansion is a bit odd’.

Underplaying issues when they arise, or over-focusing on apportioning blame, can also frustrate the ability to diagnose (and importantly stem) something worse before it happens.

3. “Strange women lying in ponds distributing swords is no system for a basis of government”

And nor - unsurprisingly - is it an effective system of governance.

Organisations that manage risk well often have lean, agile governance structures that enable them to focus on critical issues. Bloated, overly complex committee structures are inherently dangerous, and can create more risk than they manage - providing a false sense of assurance through obfuscation.

Equipping decision makers to move quickly comes down to reliable, timely insights and data, and clarity in key roles and responsibilities (including critical governance forums).

Being able to recreate or review why certain decisions were taken is part of operating in a regulated environment – 'agile' and 'lean' are not synonyms for 'less robust', and often it's a lot harder to put these simplified structures in place.

A great indicator for governance effectiveness is to look at the full cycle through the lens of ROI. Questions to support that review might include the following:

- Are your teams spending a (dis)proportionate amount of time preparing materials?
- What is the total cost of your reporting cycle?
- What work is deprioritised to facilitate reporting?
- Do stakeholders feel they are getting appropriate value from the data they receive?

An insightful, three-page report that actually informs decision making is worth multitudes more than a 300-page pack, unnavigable to a time-poor executive audience.

concluding thoughts

Achieving a self-sustaining risk culture shouldn’t feel like a mythical quest - it’s not buried in the depths of dense committee reporting, nor guarded by a second line wielding “thou shalt not” proclamations.

It lies in the everyday, and the conscious choices you make on how you run your organisation - building trust between lines, empowering meaningful challenge, maintaining transparency (especially when it’s hard), and creating governance that works with and for the business.

While embracing these ways of working takes commitment and alignment across the whole organisation, the longer-term strategic benefits of doing so are numerous - and might just make a Flying Circus feel that bit closer to the Bright Side of Life…

author

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Synopsis

Applying capital measures to operational risk is complex due to differences in risk nature and capital transmission mechanisms. This article explores key aspects of operational risk capital application, including distinguishing capital supply from demand, aligning allocation with attribution, and identifying effective risk capital assignees. It highlights challenges in operational risk ownership and the need for tailored capital demand solutions. By integrating operational risk capital into risk management frameworks and measuring its effectiveness, institutions can enhance operational risk monitoring and decision-making.

Operational risk capital: challenges and opportunities

by **Peter** Ding

use of capital in risk management

Capital is a proven tool for promoting sound credit risk management by aligning risk-taking with business strategies and optimizing risk-return profiles. Given its success in credit risk management, the industry has sought to leverage capital to enhance operational risk management. However, applying capital measures to operational risk is more complex due to the distinct nature of the risk, its interconnections, and the obscure mechanism linking risk to capital. Effective capital implementation depends on robust risk quantification; however, operational risk quantification remains an evolving field, with ongoing efforts focused on developing objective, effective, and reliable approaches.

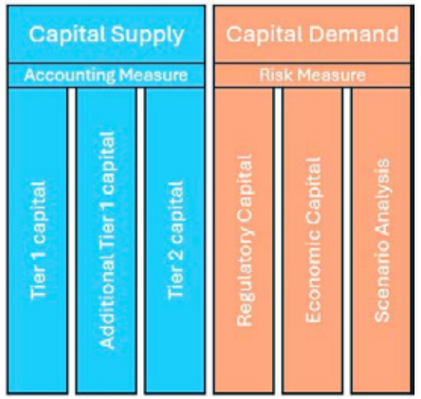
The Basel III reforms phased out the previously adopted Advanced Measurement Approach (AMA) and introduced a revised Standardized Approach (SA). Both qualitative methods—such as expert judgment-based Scenario Analysis—and data-driven techniques, including the Loss Distribution Approach (LDA), Bayesian networks, causal modeling, and recent advances in data science and Machine Learning, offer encouraging prospects for significantly enhancing operational risk quantification. Nonetheless, persistent challenges in quantification continue to hinder the effective use of capital in managing operational risk. To address these complexities, capital measures must be applied with careful consideration and tailored methodologies.

distinguishing capital supply from demand

Capital supply refers to the eligible capital resources an institution holds to meet regulatory requirements. It represents the amount of equity available to cover risk exposures and absorb unexpected losses.

Capital demand is the regulatory capital required to cover specific risk exposures, reflecting the level of risk the organization faces.

These are two sides of the same coin—capital. Failing to distinguish between supply and demand or misapplying them can reduce effectiveness and even undermine the validity of capital allocation in risk management.



It is important to recognize that the amount of capital supply is determined by accounting measures, whereas the amount of capital demand is determined by either regulatory or internal capital metrics. In practice, these two amounts are not destined to coincide. Ideally, an organization's capital supply should exceed demand by a prudent buffer to ensure capital adequacy and allow leadership to hold some capital unallocated. Conversely, if an organization's capital demand exceeds supply, it will need to either reduce risks taken by its business units or product lines or take steps to increase capital.

functions of capital allocation and capital attribution

Capital Allocation: The distribution of available capital supply across different business units or product lines to support strategic and risk management goals.

Capital Attribution: The identification of capital demand that is driven by specific risks, focusing on unexpected losses.

In short, capital allocation is more aligned with operational strategy, while capital attribution relates to risk assessment ... Properly categorizing risks, quantifying potential losses, defining risk ownership, disaggregating losses among risk owners, and aggregating multiple risks to form a holistic view of risk profiles all present significant challenges that must be addressed for effective capital attribution.

The primary function of capital allocation is to guide risk-taking, ensuring risk exposures remain within available capital capacity. By strategically distributing capital supply, organizations can align business growth with risk appetite. Conversely, capital attribution measures risk-reward trade-offs to optimize capital utilization.

In short, capital allocation is more aligned with operational strategy, while capital attribution relates to risk assessment. In principle, capital allocation reflects an organization's risk appetite, as well as its operational and risk control strategies, whereas capital attribution encompasses a series of robust approaches for identifying, measuring, disaggregating, and integrating risks. Properly categorizing risks, quantifying potential losses, defining risk ownership, disaggregating losses among risk owners, and aggregating multiple risks to form a holistic view of risk profiles all present significant challenges that must be addressed for effective capital attribution.

targeting mitigation by enabling capital assignees

To make capital an effective risk management tool, the ideal capital assignee is the risk owner—responsible for risk-taking, monitoring, and mitigation actions. Credit risk has a clear and straightforward ownership structure, where lending business units naturally take on these responsibilities. In contrast, operational risk lacks a clear ownership structure, making it challenging to identify appropriate capital assignees because operational risk is not a single risk but a collection of diverse risks with distinct characteristics:

- Some operational risks are passive and cannot be controlled in terms of occurrence (e.g., natural disasters, external events).
- Some risks have broad exposure across the organization, making ownership obscure and difficult to identify (e.g., conduct risk).
- Some risks involve separation between exposure owners and mitigation actors (e.g., cyber risk).
- Mitigating certain risks requires multiple stakeholders and involves multiple systems and processes (e.g., fraud risk, compliance risk).

When ideal capital assignees are unavailable or cannot be identified, capital should be assigned to the parties primarily responsible for risk control and mitigation actions.

tailoring capital demand solutions

Capital demand is generally assessed through Regulatory Capital or Economic Capital (EC). The Basel III Standardized Approach (SA) for operational risk provides a high-level, all-encompassing calculation with the Business Indicator Component (BIC) and Internal Loss Multiplier (ILM). BIC and ILM cannot be easily and effectively allocated among specific capital assignees. While BIC, based on operating revenue, can be attributed to revenue-generating business units, ILM—driven by historical losses—does not consistently align with BIC or revenue-generating activities.

EC is typically calculated by risk stripes, but these do not align well with business units, and EC itself may not directly correspond to BIC and ILM. As a result, neither Regulatory Capital nor EC can be readily used for operational risk capital demand attribution without a tailored engineering solution aligned with an institution’s business and risk management structures.

measuring effectiveness

The effectiveness of operational risk capital allocation and attribution in risk management can be assessed by answering the following key questions. If the answer to any of these is “No,” a reassessment of the capital application program may be necessary:

- Are there clear goals for operational risk capital allocation and attribution that align with the organization’s strategic objectives?
- Does allocated operational risk capital supply influence the capital assignee’s risk-taking activities, such as risk acceptance and mitigation actions?
- Does attributed operational risk capital demand appropriately reflect the capital assignee’s risk exposures and management effectiveness?
- Does operational risk capital application impact how the organization directs financial, technological, and human resources toward risk management improvements?

conclusion

Leveraging capital for operational risk presents an opportunity to enhance risk management effectiveness but comes with significant challenges that require a credible, transparent and firm-wide approach for allocation and attribution. Understanding the distinct roles of allocation and attribution and setting clear objectives are crucial for success. By using capital allocation to guide risk-taking and capital attribution to assess risk management effectiveness, institutions can strengthen their operational risk frameworks. Regularly reviewing key effectiveness questions ensures ongoing improvements in capital application programs, ultimately reinforcing the organization's overall risk management practices.

Disclaimer: The author used AI assistance in the editing phase of writing this article.

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peer-reviewed by

Steve Lindo

Synopsis

This article looks at the role of risk in strategy formulation, highlighting the lack of a consistent structure for developing strategy despite greater regulatory interest in this topic. The article walks risk practitioners through a thoughtful framework to navigate the complexities of modern strategy development with stops to show the detailed steps along the way.

The power of risk: a key element to effective strategy genesis

by **David** Hanley

introduction

Today's world is arguably more dynamic and uncertain than ever before. Geopolitical risks and economic volatility mean strategy is exposed to highly unpredictable environments, now the new normal. The author argues that in the strategy domain risk has evolved from being merely a review tool for senior management and boards to becoming a key element of strategy formulation itself. The article emphasises the need for an increased methodical and thoughtful approach to strategy, highlighting the growing criticality of the role risk plays as a key element in that process.

why strategy is different now than before

In the digital era one key element to keep in mind in strategy development is the uncertain environment in which we operate. Kodak, Blockbuster Video, Nokia, Blackberry the list goes on, how much better might these companies have fared if they had a strategy capable of surviving the uncertain environments they encountered. More recently we have witnessed Covid 19, the Ukraine war, the failures of WeWork and Silicon Valley Bank, and a new US administration sending shock waves across the world. Arguably never has it been more important to understand what good strategy looks like in a VUCA (volatility, uncertainty, complexity, ambiguity) environment. VUCA looks to be only increasing, and the same can be said of the evolution further towards a TUNA environment (turbulent, uncertain, novel, and ambiguous). Professor Stephan Meier, of Columbia Business school, put it well in saying:

> ***"In today's world, there is great uncertainty. With all the rapid change, it can feel like a new world almost every day."***

The prevailing VUCA/TUNA environment persisting today warrants a growing imperative to involve iterative risk assessment as a core element in an entity's strategy development cycle, respecting Professor Michael Porter's view that:

> ***"The essence of strategy is choosing what not to do."***

why use a Strategy Development Framework (SDF)

There is little in terms of practical guidance on how do a thorough job on strategy execution. This is not the case for some other imperative organisational disciplines. A good example of this is in the banking Sector, where there is extensive regulatory guidance for the following:

- Capital Management: Internal Capital Adequacy Assessment Process ("ICAAP")
- Liquidity and Funding Management: Internal Liquidity Adequacy Assessment Process ("ILAAP")
- Recovery and Resolution Management: Recovery Plan

In the broader corporate world, there are extensive materials providing guidance on Enterprise Risk Management (ERM). The following are all good examples:

- COSO – Enterprise Risk Management: Integrated framework (COSO, 2004)
- ISO 31000 – Risk Management Principles and Guidelines (ISO, 2018)
- CIIA – Three lines of defence model (2015)

The author has searched, and may stand to be corrected, but is not aware of any similar equivalent guidance on strategy management or the collation of a Strategy Development Framework (SDF). This absence of guidance presented as a practical challenge for the author over time and resulted in a consideration of first principles to conceive of an SDF to a sufficient standard to pass regulatory diligence.

core elements

A key focus in strategy formulation is to keep things simple and intuitive, as this lends itself to the broadest buy in from all strategy touch points and stakeholders. Creating a bespoke SDF for an entity can be extremely useful for the creator. It results in going back to first principles and builds an effective means of enforcing discipline on the strategy development process. A key preliminary step is to define the core elements of the strategy.

These core elements form a foundation for the more detailed build out of a framework bespoke to the entity. Moreover, the elements also provide a foundation for more detailed policies and procedures if so required. In short, the elements are the spine of the Strategy Framework, Policy and Procedures, which all form a powerful driver conveying a compelling logical intuitive approach for all those touched by strategy execution.

In the opinion of the author an effective SDF should frame client deliverables, and the capability required to deliver on customer propositions over time, and the commercial rationale. Another critical element to strategy development that should be included in the SDF is a symbiotic risk review via an iterative Strategy Risk Assessment (SRA).

The following is a stylised example of the core elements of an SDF which could be applied across multiple industries, called the '3CR Model,' illustrated below:

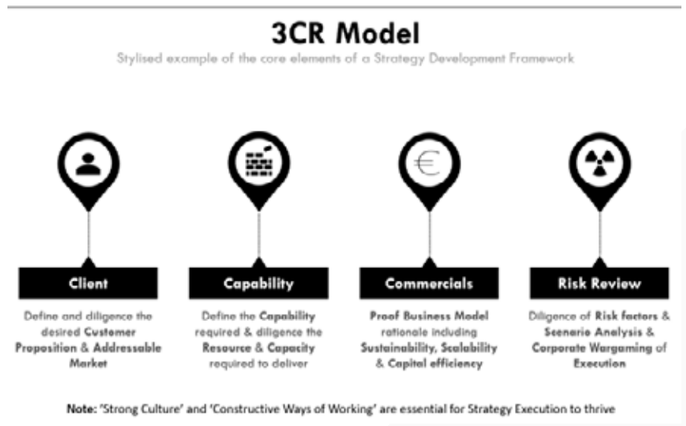

Figure 1. 3CR Model of a Strategy Development Framework

The focus of this article is one of those core elements: risk assessment.

risk as a core element to strategy formulation

The author admits to being adamant that solid risk assessment is fundamental to thorough strategy formulation, and has gone so far as to self-define a Strategy Risk Assessment (SRA) thus:

> ***"The process by which the strategy of an organisation is formally assessed for any potential risks implicit and explicit to that strategy."***

Assessment can intuit the activity being an afterthought, it is critical however to note that the SRA approach should be embedded in the very genesis of strategy. It is not a one-off exercise; it is an iterative process aimed at continuous improvement.

Intuitively launching a strategy without bespoke risk assessment is an alarming thought. The reality is that it happens. The author can testify as to the critical strength of risk in strategy genesis having conducted numerous Strategy Risk Assessments (SRAs) identifying risks and mitigating actions particular to new cyclical strategies.

Strategy Risk Assessment (SRA): how does it work in practice?

Workshops are set up with the lines of business and support functions focusing specifically on the new strategy. In these workshops the front-line business and related support units consider the detail of the strategy in the context of the core elements of the SDF. Workshops are supported by the teams responsible for collating strategy and business controls. The strategy risk assessment process enhances the identification of potential risks and mitigating actions bespoke to the new strategy. The team will also be aware of the broader organisational material risk assessment/risk heatmap and related scenario analysis. Together, the outputs from existing embedded risk processes and the supplemental work carried out under the SRA assist the Board in the consideration and diligence of the new proposed strategy. The value of the exercise becomes clear as critical issues emerge for consideration that likely would not have presented otherwise. Matters such as capacity of resource versus quantum of change, lack of detail on commercial rationale and deeper diligence on the amount of group funding and technology requirements can be revealed. Outputs are captured and documented conforming to pre-defined templates. A final collated pack is presented for review and challenge by senior management and ultimately the board.

To the knowledge of the author, many entities never complete this express form of formal, symbiotic, bespoke strategy risk assessment. It is of little surprise that it seems regulators are now becoming keen to see evidence of a formal risk assessment of a term strategy, evidence of the importance of the strategy risk management discipline. Forming a strategy without appropriate iterative diligence of risk can be unwise if not fatal.

conclusion

One way to achieve more effective strategy is to create a bespoke Strategy Development Framework for the entity. The core elements of the framework should be intuitive and not overly complicated. The elements form the spine of the Strategy Framework and associated policy and procedures. In this article, a ‘3CR’ example of such a framework was shared. Customer, Capability, Commercials and Risk assessment formed the core elements.

The purpose of this article was to argue the case for risk being a core element in an effective SDF. Strategy is hard. Effective strategy execution demands disciplined preparation and a willingness to recognise the challenges and face into them sooner rather than later. Effective strategy risk management is helpful in identifying challenges that otherwise may have remained opaque. The power of strategy risk assessment for strategy decision development is in the contemplation and simulation, not the prediction. It is the contemplation and simulation that typically results in an evolution towards a more robust strategic approach.

Given the prevailing and increasingly uncertain environment it is argued that risk now warrants focus as a core element of strategy genesis, not just some form of post strategy completion review. Incorporating iterative risk assessment into strategy development also affords unique opportunity to enhance thorough cross departmental collaboration. Frame the strategy, game the strategy, and celebrate ownership and buy in to the strategy.

author

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Born and educated in Ireland, David is the founder of SentinelReward Ltd., a solo consultancy specialising in risk management. David has over 25 years proven leadership across senior executive roles working across Europe, UK, Asia and North America.

David has a bachelor’s degree in business studies specialising in Financial Services, from Dublin Business School and Liverpool John Moores University. In 2019 David completed the Financial Technology and Financial Innovation programme in Oxford University Saïd Business School. In 2021 David completed the Chartered Director Diploma and Certificate with the Institute of Directors. In 2022 he graduated with 1st Class Honors in Advanced Banking Risk Management from University College Dublin. In 2024 he completed another Masters Level 9 Diploma in Strategy also with 1st Class Honors and is currently studying a further Level 9 Diploma in Sustainable Finance Reporting, and an MSC in Financial Services in UCD via the Institute of Bankers.

peer-reviewed by

Carl Densem

Synopsis

Applying Expected Credit Loss (ECL) thinking—originally developed for financial institutions—can enable nonprofits to more proactively manage risks. This includes such steps as monitoring early indicators, such as donor payment delays or economic shifts, and developing scenario plans that better insulate them from funding shocks and disruptions.

Strengthening nonprofit strategy with ECL thinking

by **Katlego** Majola

introduction

Imagine a humanitarian organization—thriving one day, then losing its core funding almost overnight. A key donor country shifts foreign policy, and the devastating blow lands. Yet, the writing had been on the wall: months of political tension, public statements, and delayed grant renewals were all early warning signs. Without a system to interpret these critical signals, the organization was needlessly blindsided.

This scenario is far too common. Many nonprofits still rely on backward-looking tools—like historical budgeting or static forecasts—that consistently miss the early signs of change. Shifts in donor behaviour, economic downturns, or geopolitical disruptions are not isolated events; they often compound. The real issue is not inherent uncertainty; it is our tendency to treat foreseeable risks as unexpected surprises. This is precisely where Expected Credit Loss (ECL) thinking becomes essential.

Originally designed for financial institutions, ECL offers a powerful framework for nonprofit leaders, risk managers, and board members ready to move from reactive crisis management to proactive resilience. Whether you lead a global humanitarian operation or a vital local community organization, adopting an ECL mindset can help you anticipate disruptions and strengthen long-term sustainability.

ECL in plain English

Think of Expected Credit Loss as your organization's financial weather forecast. Instead of passively waiting for a funding storm to hit, you actively monitor early indicators—like consistent donor payment delays, slowing grant pipelines, or broader economic shifts—and plan accordingly.

Traditional planning might simply project: "We raised $1 million last year, so let us plan on $1 million this year." ECL thinking, however, prompts a more strategic question: "Based on current trends and early indicators, what are three likely funding scenarios for the coming year, and how will we strategically respond to each?" For example, a humanitarian organization could proactively track foreign aid sentiment, regional instability, or legislative changes to spot potential funding threats in advance. This foresight enables pre-emptive action, such as aggressively diversifying income streams or strategically adjusting program timelines before the storm arrives.

why foresight matters?

The COVID-19 pandemic illustrated this need. Many nonprofits watched funding dry up while demand for their services skyrocketed. Few possessed the tools to truly anticipate the crisis's financial impact. A 2021 study of over 1,000 African civil society organizations revealed widespread financial strain, and by 2022, nearly half of U.S. nonprofit leaders still feared for their economic viability.

Building true resilience demands more than just hope; it requires a robust framework for anticipation and preparation. ECL provides precisely that. While its origins lie in the IFRS 9 accounting standard for estimating credit losses, ECL's core principles—early warning systems, dynamic scenario planning, and continuous risk review—translate seamlessly and powerfully into the nonprofit sector.

Effective uncertainty management is not about perfectly predicting the future; it is about preparing intelligently. ECL empowers nonprofits to establish practical early-warning systems to spot trouble far ahead of time.

common early indicators

Look for recurring delays in receivables from major institutional funders, a sustained decline in donor renewal rates, or negative trends in grant pipelines. Additionally, keep an eye on volatility in currency exchange rates that could impact funding value, and significant shifts in geopolitical dynamics signalling potential interruptions to commitments. Even simple dashboards or spreadsheets tracking just 3–5 of these indicators monthly can provide your organization with crucial lead time to act before minor issues escalate into major crises.

scaling ECL thinking

You do not need complex financial models to embrace ECL thinking. For nonprofit organizations, adopting a lightweight version focused on financial funding risks can be incredibly effective. Here is how even smaller organizations can implement this approach:

1. Identify your top 3 funding risks

- Think broadly, considering both internal vulnerabilities (e.g., reliance on a single major donor, expiring multi-year contracts) and external threats (e.g., high inflation, global recession, regional conflicts, upcoming donor country elections).
- Ask: What specific events could realistically cut off or significantly delay your biggest funding streams?

2. Set up monthly tracking

- Utilize simple, accessible tools to consistently monitor your chosen early indicators.
- Pay close attention to patterns—a repeated delay in donor contributions, for instance, should immediately signal a need for deeper investigation.
- Also, track relevant macroeconomic indicators (unemployment trends, GDP growth) that might indirectly impact your funding environment.

3. Plan your risk response

- Dedicate one hour quarterly to structured "What if?" discussions.
- For each of your top risks, develop concrete response plans.
- Ask: If your largest institutional donor unexpectedly cuts funding, what is your Plan B? Who needs to be informed? What programs can be temporarily delayed, scaled down, or paused without jeopardizing your core mission?

Tip for small teams: Appoint one person to champion this effort. Frame it not just as "financial control," but as "mission protection"—it's about ensuring your vital work can continue even when the world gets rough.

who should drive ECL adoption?

In larger organizations, risk managers are ideally positioned to spearhead this work, collaborating closely with finance and program teams. In smaller nonprofits, this responsibility often falls to executive directors, CFOs, or dedicated board members with oversight of strategy and funding. The critical element is ensuring ECL thinking becomes an integrated part of everyday planning and strategic decision-making at all levels.

Start small, but start now:

- List your organization's top three funding risks.
- Pick just two to three key early warning indicators to track consistently.
- Schedule a dedicated 60-minute quarterly discussion focused on "what might happen next?"

Over time, this deliberate habit will cultivate a robust culture of foresight and flexibility—transforming uncertainty from a threat into a powerful strategic advantage.

conclusion

ECL thinking is not about achieving perfect prediction; it's about robust preparedness. In a world where disruption is the new normal, nonprofits can no longer afford to plan with blinders on. By adopting ECL, you are not just surviving; you are building the inherent resilience to truly thrive. So, what is one risk indicator your organization can start tracking this week?

Disclaimer: The author used AI tools (Google Bard to refine sentence clarity and Grammarly for grammar editing) during the drafting process. The content is entirely the author's own work and was thoroughly reviewed and verified for accuracy.

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Synopsis

Fishbone diagrams which are also known as Ishikawa Diagrams have their roots in production management with an objective to identify and group causal factors which result in quality and production issues. This concept is now widely used by other industries and domains as well. The diagrams are extremely useful in the risk identification phase of business processes within an organization. This article explains the underlying concept of fishbone diagrams and builds a case for applicability in other domains using teller operations of a bank.

De-risking business processes using fishbone diagrams

by **Venkat** Srinivasan

introduction

Ishikawa diagrams are causal diagrams created by Kaoru Ishikawa to show the causes of a specific event. The Ishikawa diagram was developed by Kaoru Ishikawa, a Japanese engineer, during the 1960s as a way of measuring quality control processes in the shipbuilding industry. They resemble a fish skeleton, with the "ribs" representing the causes of an event and the final outcome (problem) appearing at the head of the skeleton. The purpose of the Ishikawa diagram is to allow management to determine which issues have to be addressed in order to gain or avoid a particular event.

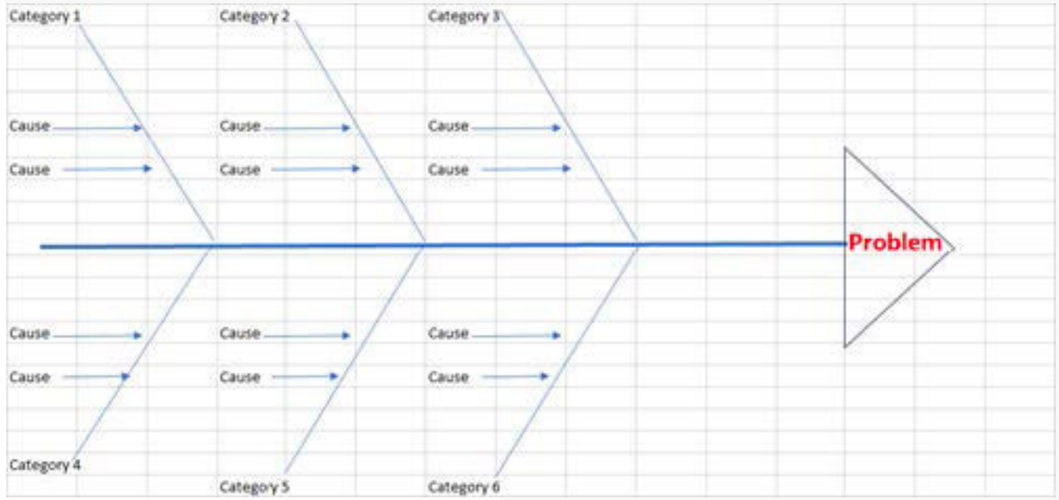

Figure 1. Example of Fishbone diagram

Processes break down when you least expect (Murphy's law). A fishbone diagram can help you look at the different factors which led to the issue and help

1. Agree on the problem and write a problem statement which goes into the 'head' of the fish

2. Decide on the categories of the causes of the problem. These categories could be systems, processes, people and general environment for example. Stamp the categories as branches from the main spine of the fish.

3. Determine causes under each category for why this happened. The group needs to ask the question – Why did this happen? Further downstream analysis is explained in the next section.

> **Box 1: Step 3 in action - The 'London Whale'**
>
> In 2012, a USD $6 billion loss by JPMorgan Chase shocked the financial world. The incident, called the 'London Whale' scandal, was caused not by market volatility, but by an Excel error. A manual error led to a massive miscalculation of the bank's exposure to complex financial instruments. This could be a good candidate for drawing a fishbone diagram with the head of the fish reading as 'Error in Treasury risk Assessment' with categories as processes, people, controls and infrastructure.

Given the manner in which processes are visualized in a fishbone diagram, one can easily determine if some part(s) of a setup require improvement. The fishbone diagram holds some unique advantages in this regard. It can help identify those opportunities in an actual context – the core process. Furthermore, using a fishbone diagram over multiple iterations of some change can help you visualize how that change is affecting other, connected processes.

If an organization were to design a process for Six Sigma, a logical starting point could be a fishbone diagram, thereby ensuring that one has captured all of what goes into the process – success or failure. There would be a high comfort level that all components of the process have been included.

concept application

Here we take the case of teller operations at the branch of a bank. The bank figures out that the average wait time at the counter is 15 minutes which is way above what a customer, or for that matter the bank, would want. The problem tends to get compounded during the first week of the month when salaries are credited to customer accounts and there is a spurt of withdrawals and other payment requests such as utilities and opening of time deposits for which customers visit the branch. The risk to the bank is that customers may move to a competitor due to the poor service levels at the branch. They form a brainstorming team which comes up with the following fishbone diagram:

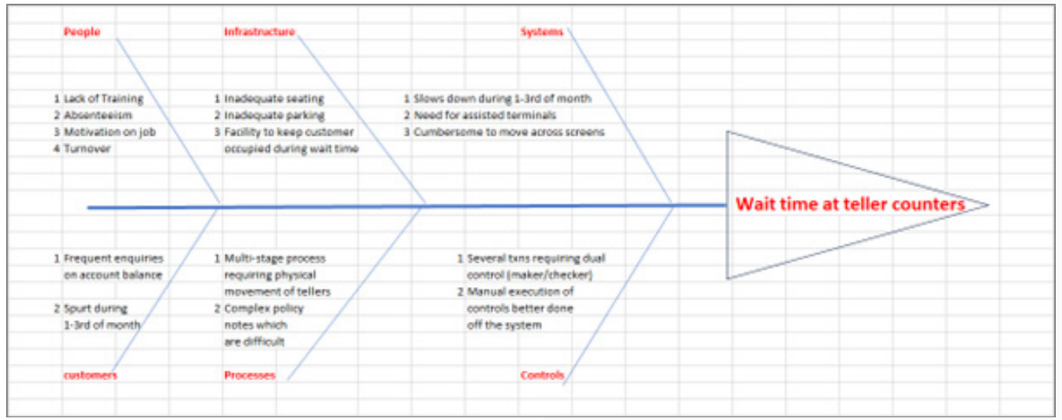

Figure 2. Fishbone diagram applied to teller operations

This diagram gives a 360-degree view of the problem and what needs to be done. What the team needs to do is to now assign a probability to each of these events (those which are quantifiable) and the number of customers affected so that they can measure the results pre and post the corrective action. One may end up with several line items to de-risk customer satisfaction and attrition so the bank may assign a probability and weight to each line item (based on number of customers impacted) and decide to address the items in the order of weight descending.

Now, addressing this may need multiple actions such as transitioning customers to electronic channels, improving systems performance, changes in policies, training and additional staffing through rotation. This would be best known and handled by the organization doing the fishbone exercise. Once these corrective actions have been implemented, one may still be left with some residual risk. The residual risk would be the probability of that event happening after corrective actions. Management then decides whether the organization can live with the risk.

For example, ‘spurt during the 1st to the 3rd’ may be impacting the largest number of customers and may end up with the highest weight. Several branches across banks have ‘Customer assisted terminals’ at branches, so anybody visiting the branch can do a balance enquiry or deposit at these terminals with some help from the branch as a straight-through process, thereby reducing the pressure on tellers due to the spurt. This could be a risk mitigation measure for the spurt event which would however require investment in new technology.

conclusion

The fishbone diagram is easy to construct, flexible and helps to find the root cause of problems. What it requires is a fair amount of time and effort from various stakeholders to come up with a diagram that captures almost all of what is required to address the problem. For a risk manager this is a good solution to have in the toolbox when looking at underlying processes and ways and means to de-risk. The fishbone is an effective mapping device for processes such as loan origination, domestic and cross-border payments, understanding handshake risks between front-, middle- and back-office in treasury operations. It is left to the imagination of the risk manager on how best to construct and use the tool for risk mitigation.

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peer-reviewed by

Rick Nason

Synopsis

Risk practitioners should recognize both the productivity gains and unique challenges that AI/ML introduces to risk and compliance, such as transparency and bias issues in a strictly regulated environment. Adopting AI/ML demands a careful, due diligence-driven approach to ensure meaningful value while maintaining risk standards.

‘AI for risk’ or ‘risk of AI’ – adopting AI in risk and compliance

by **Saptarsi** Ray

introduction

Artificial Intelligence and Machine Learning (AI/ML) is now seen as being the primary driver for future productivity gains across industries, and financial services in particular. The risk and compliance function has been relatively slower to adopt new technology than other areas but probably for the right reasons.

At the same time, risk and compliance has been under pressure to ‘do more with less’ to manage the ever-evolving typologies of risks in the financial services industry and comply with too many regulations without letting the rigor of risk monitoring drop. The new concepts coined by the regulated entities and regulator alike are testimony to that future journey (see Box 1).

While AI/ML can help risk and compliance, it brings its own set of challenges like a lack of transparency and risk of bias that pose significant challenges in a strictly regulated industry like financial services. Hence, it is imperative to design and implement the proper security guardrails to reap the benefits of AI without compromising standards.

This article looks at a comprehensive set of AI/ML business use cases for risk management, considerations to be made by the financial institutions and a due-diligence based approach for adoption based on a thorough cost-benefit analysis.

Box 1: Definitions

‘Compliance by design’ is a proactive approach towards compliance where compliance requirements are woven into the design of systems and products.

‘Regulation as code’ ensures regulation can keep pace with speed of technological innovation and promotes compliance as it allows computers to understand regulations encoding those as machine readable code.

AI/ML buiness use cases for risk and compliance

AI and ML may be leveraged not only to automate routine activities but also generate data driven insights and flag early warning signals that may help to proactively manage risks. We, as risk practitioners, have experienced specific challenges that different financial institutions have faced where AI/ML can help either to improve efficiency, reduce costs or augment the capability of decision making.

> ***The institutions that have already take a plunge have used a thorough cost-benefit analysis and adopted a proper due diligence approach ... implementation has also been in a phased manner backed by proof-of-concept.***

In the last few months during my conversations with CROs and their senior stakeholders in the risk and compliance team, interest is clearly rising in leveraging AI/ML to bring value to their department and the overall organization. However, the teams have been cautious in their approach and adopted a due diligence-based approach based on cost-benefit analysis to ensure return on investment (ROI). Below are several practical AI/ML business use cases across different risk typologies based on my recent conversations.

It is worth double-clicking on the application of AI/ML techniques for validation and preparation of market data for market risk calculations.

Financial institutions face challenges with data quality and reconciliation issues (with fragmented or incomplete data) involved with the market data procured from data providers and must use complex bootstrapping or forward fill methods that incorporate latency and human error leading to incorrect portfolio valuation. AI/ML techniques (Random Forest, K-means clustering, Autoencoder for example) may be used to screen historical data to identify specific signals or anticipate market movements. They can also run simulations using ML/NLP learning to identify new patterns or outliers and establish connections of market parameters with asset prices that are not otherwise evident.

Table 1. AI/ML Use Cases in Risk and Compliance

Risk typology	Business Use Case
Enterprise risk management and operational risk management	▪ Generate scenarios for Operational and IT resilience (BCM) ▪ Automate drafting policies and procedures partially ▪ Automate audit and control test ▪ Generate synthetic loss data to complement internal loss data for Operational Risk Management loss data analytics
Compliance risk	▪ Parse large regulations, interpret key requirements and map against policies to identify gaps ▪ Act as virtual regulatory and policy expert by training to answer questions on regulations / policies ▪ Automate checking of regulatory compliance and provide alerts for potential breaches
Financial crime	▪ Improve predictive capability to detect fraud and identify new patterns ▪ Analyse large set of transaction data, customer profiles to identify suspicious activities ▪ Generate suspicious activity reports ▪ Integrate external media and social information with watch-list for sanctions screening
Credit & Counterparty credit risk	▪ AI algorithms may improve precision of predicting default probability and loss severity ▪ ML algorithms excel in analysing vast socio-economic data sets to identify subtle patterns and correlations that may escape traditional analysis ▪ AI may integrate automation and near real time analysis especially of SME and corporate clients to enable faster yet better credit decisioning ▪ Generate early warning signals using predictive capability of ML and devise proactive approach for collections ▪ Draft credit memo and contract ▪ Identify connected counterparties and stress testing to explore possibility of systemic default
Market risk	▪ Screen historic market data to anticipate market movements, discover 'errant' patterns or outliers and plug data gaps using data imputation techniques ▪ Traders may leverage AI for efficient, customized investment advices by uncovering hidden connections between assets and their price movements to achieve desired positions, getting real-time warning signals and using sentiment analysis to gauge public sentiments about companies and markets ▪ Generate potential and plausible scenarios and improve stress testing results by applying correlations accurately
Liquidity risk	▪ AI may help to predict liquidity positions more accurately by improved scenarios, accurate simulation of dynamic cashflows ▪ It may also help to improve the behavioural models
Model risk	▪ AI models can train on historical data and ensure that the models continuously improve to remain accurate ▪ It can also automate monitoring of model performance and generate alerts ▪ ML may be leveraged to test market models ▪ AI may also help to draft model documentation and prepare model validation reports
Cyber risk	▪ Check cybersecurity vulnerabilities, help in red-teaming (simulating attack scenarios) and improve detection of security incidents
ESG & Climate risk	▪ Automatically generate reports on ESG and sustainability ▪ Automate data collection for counterparty transition risk assessments and generate early-warning signals based on triggering events

cases of AI adoption in risk and compliance

Interactions with risk and compliance leaders show that few of the leading financial institutions have already invested in developing such use cases while the others are in the process of seriously assessing the benefits against the costs and risks involved in leveraging AI.

Interactions with risk and compliance leaders show that few of the leading financial institutions have already invested in developing such use cases while the others are in the process of seriously assessing the benefits against the costs and risks involved in leveraging AI.

The institutions that have already taken a plunge have used a thorough cost-benefit analysis and adopted a proper due diligence approach. Some of the institutions have set up committees comprising of senior executives who have evaluated each proposed business use case by various departments and have acted as the gateway to ensure that the projects are taken up based on practicality, not merely overzealousness. Implementation has also been in a phased manner backed by proof-of-concept.

Below lists such use cases implemented by several leading financial institutions in recent times:

- JP Morgan Chase (JPMC) is using LLM in Fraud detection and in sanctions screening
- JPMC has also implemented IndexGPT, a generative AI based tool to create tailored investment portfolios and strategies for individual clients' unique goals and risk tolerances
- JPMC has also developed AI driven credit scoring models to predict the loan defaults better and identify the credit-worthy customers
- JPMC is using Chat-GPT based model to analyse Federal Reserve's directions in policy changes and trading
- Citibank's automated process discovery (APD) helped them to improve risk assessment and decision making
- Broadridge is using BondGPT to improve portfolio construction and bond selection
- BNYM is helping wealth advisors to build actionable insights for customers
- Morgan Stanley is using Gen AI to help financial advisors to answer investor's queries

Next are further details on the top two cases to explain how different the current solution is from the traditional one and how it adds value to JPMC.

1. Fraud detection engline

As the traditional fraud detection is reliant on manual analysis and rules, it lagged evolving cybercrime tactics and resulted in false positives, client dissatisfaction, or false negatives, exposing the bank to financial and reputational risks. This challenge continues to grow due to the inorganic growth in volume and complexity of the transactions.

JPMC implemented machine learning algorithms and predictive analytics to process vast datasets and learns from historical fraud patterns and thereby continuously evolves to counter new threats. Key components of this solution include machine learning models trained on historical transaction data, real time monitoring of transactions, swift detection and response, natural language processing to scan unstructured data like communication logs to detect fraud and behavioural analytics to identify deviations from typical patterns.

Key capabilities such as anomaly detection, scalability and adaptive learning helped JPMC to realize benefits in terms of improved regulatory compliance (e.g. global AML standards), increased operational efficiency and enhanced confidence of its clients to protect their assets.

2. IndexGPT

Traditional investment strategy, based on a mix of historical data, financial models, and expert judgment, though effective, had its limitations in terms of scalability and offering ultra personalized strategy.

IndexGPT is built on the principles of generative pre-trained transformers and uses sophisticated algorithms to analyse market data, predict trends, and suggest optimal portfolio allocations for clients. IndexGPT's key capabilities, such as personalized portfolio design, real-time market analysis, diverse asset coverage and predictive insights, extends beyond traditional portfolio management tools by offering real-time updates and adaptive strategies that align with clients' evolving financial goals and market conditions.

choosing the right AI solution

As there are numerous AI solutions available in the market, it is crucial that a financial institution develops a comprehensive selection framework based on its priorities (functional and technical features available, ease of integration with other systems, availability of skills, time to market, pricing and the future product roadmap) and relevance to the critical requirement of the risk management and regulatory compliance (key functionalities) it is expected to satisfy.

It is equally important that the financial institution works out the details around a viable operating model (preferably a RACI matrix) to establish the ownerships and demarcate the responsibilities on how the solution should be supported and maintained moving forward. Those details may go into the legal and commercial agreement with the vendor and should also include the details of IP ownership.

Financial institutions must develop a comprehensive governance framework to implement and monitor usage of AI/ML. This must be a board room topic and driven from the top to ensure that all the security standards are adhered to and there is no compliance breach in terms of data privacy and security in the over-enthusiasm of quick implementation process. They must take a cautious and due-diligence based approach to analyze the costs and benefits of each business use case and take a pragmatic view before investing.

Box 2: Questions to ask for Fis considering AI

- Has the institution established a formal governance structure and formal process to prioritize and select the risk & compliance business use cases?
- Does the institution have a proper vendor selection and procurement model to take care of the legal and commercial aspects to establish ownerships for vendor provided solution?
- Has the institution implemented proper security guardrails to ensure that the solution complies with the security standards expected by the regulators?
- Has the institution understood the skills / capabilities required to develop and maintain the AI based solution and established a center of excellence to cater to it?

Finally, they should keep in mind that AI/ML should be used to automate certain tasks but must be validated and approved by experienced individuals to take the decision. Otherwise, cases like Citibank's algorithmic trading blunder in recent times will continue to haunt them and may cause severe reputational damage.

conclusion

AI is Hobson's choice for financial institutions, risk and compliance is no different. AI comes with so much promise that it is no longer a choice for financial institutions not to use it. However, they must ensure that the security guardrails are implemented properly and the right approach is adopted to reap the benefits without falling on the wrong side of the regulators and other stakeholders.

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Synopsis

The article describes manipulative practices in the credit default swap (CDS) market which compromise market integrity. For risk practitioners, the key takeaways are the critical importance of regulatory efforts like SEC Rule 9j-1 in mitigating such opportunism, and better understanding of the shenanigans as they will not be the last.

CDS shenanigans in the SEC crosshairs

by **Pete** Vatev, **Pawan** Jain, **Manu** Gupta

introduction

Credit default swaps (CDS) were meant to be a form of insurance. Protection buyers pay premiums to protection sellers, and in return, they receive a payout if the underlying borrower defaults. Simple, right? Well, as with all things in finance, the devil is in the details. Enter the realm of opportunistic CDS strategies.

Before the Securities and Exchange Commission (SEC) stepped in with Rule 9j-1[1] in 2023, such manipulations had undermined the credibility of the single-name CDS market (and potentially also the CDS indexes like CDX and iTraxx), potentially affecting liquidity and volatility in CDS markets. Let's looks into some examples of CDS-related pretzel-twisting intended to either trigger or prevent triggering CDS payouts.

examples of CDS shenanigans

Hovnanian

Hovnanian's engineered selective default in 2018[2] was one of the more egregious examples. On top of that, in exchange for favorable financing from GSO Partners (the CDS protection buyer in this case, having purchased $333 million[3] of CDS protection on Hovnanian debt), Hovnanian agreed to create a CDS-auction-deliverable low-price bond[4] that would likely result in a low CDS auction final price,

auction final price, effecting a high recovery rate on CDS. This higher recovery rate is of course great for a CDS protection buyer who is net-short the credit.

All this wasn't just about triggering a CDS payout (via creating a 'credit event' by the corporate borrower deliberately missing a coupon payment), and then making that payout bigger (via creating a low-rice auction-deliverable bond). It was also about market integrity in the single-name CDS market. GSO settled with the CDS protection sellers, and some may presume it did so in exchange for a payment from CDS protection sellers.

iHeart and Codere

Similar cases were the failure-to-pay credit events that were triggered by deliberately missing coupon payments by iHeart Communications[5] and Codere[6]. A different strategy favoring CDS protection buyers is called net-short debt activist and was illustrated by Aurelius Capital in 2017 which eventually led to Windstream Holdings filing for Chapter 11[7] after Aurelius filed a petition for the debtor's involuntary bankruptcy.

McClatchy

Such opportunistic strategies help the CDS protection buyers, but let's not forget about the CDS protection sellers. Take McClatchy, whose 2018 refinancing efforts[8] were financially aided by a CDS seller and led to a reduction in the amount of qualifying debt, which in turn affected the payouts on CDS contracts. This move was seen as an opportunistic strategy to minimize payouts to CDS protection buyers[9].

Supervalu and Neiman Marcus

The saga continued with Supervalu in 2019[10], where the company's debt restructuring efforts were perceived to manipulate the CDS market via a technique referred to as "CDS orphaning". Similarly, Neiman Marcus in 2019[11] also engaged in a debt restructuring efforts that may be perceived to be an opportunistic strategy to reduce the notional size of its CDS contracts and limit payouts to CDS buyers.

rule 9j-1

Fast forward to August 2023, when the SEC steps in with Rule 9j-1. It aimed to curb engineered CDS transactions through application of anti-manipulation prohibitions[12]. However, the SEC did not lay down specific triggers for Rule 9j-1 applicability and instead adopted wording that indicated a broader fact-based inquiry approach to be employed when determining whether a purported CDS manipulation has a "bona fide" commercial need.

Consequently, the SEC's choice of language may have been interpreted by single-name CDS market participants as giving the SEC the discretionary powers to interpret Rule 9j-1 either broadly or narrowly. This flexibility at the expense of clarity may have had the effect of scaring off not only obvious CDS manipulative behavior but also some legitimate transactions that could have been potentially characterized by the SEC as manipulative.

key takeaway

The participants in the vast single-name CDS marketplace are swaps dealers (some of which are subsidiaries of major global banks), banks, insurance companies, non-financial corporations, pension funds, hedge funds, and asset managers[13]. They all would get to benefit from SEC's Rule 9j-1 which aimed to clean up the opaque single-name CDS market's worst manipulative practices. The SEC has alerted CDS market participants that it is keeping an eye out for opportunistic CDS strategies and that it now is better armed to police them. Whether Rule 9j-1 has truly tamed the single-name CDS market, only time will tell.

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Synopsis

The author's honed risk management instincts were piqued in this tale of what should have been a relaxing beach-side lunch with less-than optimal service—and worse than that—no ice cream for dessert. This serves as a compelling analogy for organizations that may just as laxly be approaching their risk management programs, leading to disgruntled employees, alienated clients, reduced market share, and lost profits—profits being the ice cream of the corporate world.

Risk management in the sand: how a beach café can serve as a parable of risk management gone awry

by **Ainur** Bakiyeva

introduction

I work as a risk manager, and my professional instinct is to observe how processes are built—whether I am at work or not. Even when I am on vacation, I can't help but notice when something goes wrong in the system. Once, while dining at a beach café, a server with a clearly unhappy face slammed my glass of fresh mango juice onto the table so hard that juicy yellow splashes flew in every direction. He served the hot dish just as abruptly. I thought: there's a clear lack of employee engagement.

The café was right on the sand. For some reason, the servers wore Crocs, and with every step, dry sand shot through the holes like a fountain. As my server approached, my long skirt became a target for his sandy shoes. I wondered—does no one here think about customer experience? After all, the customer journey has long become a battleground in the war for attention in today's oversaturated market. Give just a little more than the client expects, and you have already won. Then again, maybe the customer experience team was doing its job well—and the problem lies elsewhere. Perhaps the poor guy was just deeply uncomfortable, with hot sand blasting between his toes inside those Crocs. But if that is the case, why has he not said anything to his manager? Is he afraid? Or has he given up, thinking it's pointless?

Miscommunication risk is one of the most common—and underestimated—hazards in any organization. It shows up in the cracks between managers and their teams, across departments, or in dialogues with external partners. And here is the key: the risk of misunderstanding is not just about relationships anymore—it is about the inability to align around a shared strategic goal. When it was time for dessert

I suddenly lost all interest. The waiter, with a tired shrug, said he had to “go check” what ice cream flavors were left. That was it. Appetite gone. I could not help but think—if you’re selling a product, shouldn’t you know it by heart? Rule number one in sales: know your product.

people drive vision

As Steve Jobs famously said, people don’t need choices—they need a great product. So why do we still need salespeople in shops, travel agents, or servers in restaurants? After all, dessert names can easily be listed in an app, and orders sent straight to the kitchen, just like food delivery services do.

And yet… restaurants still have servers. They are everywhere. Working, chatting, smiling (or not), and collecting generous tips. Why?

Every time a company brings up commercial risk or the risk of lost profit, I always return to the same questions—about people.

1. Do they truly understand their role?

2. Do they see how their role benefits them personally?

3. Do they share the company’s values and culture?

What happened next would have sounded like a joke—if it had not happened to me. A completely different server brought over my bill, and it was way lower than expected. I had a good idea of what I owed (and yes, the Tom Yum soup was excellent), so I instinctively started scanning the items. None of it was mine. They’d mixed up the checks between tables.

And that’s where it gets real. This one small error could have cost them more than a few missed baht. First, they would come up short at the end of the month. Then, to cover the gap, the blame (and the deduction) would likely fall on an already unmotivated employee.

Unchecked processes are not just a financial risk—they quietly sabotage your strategic goals. Because at the end of the day, it is people who drive the company toward its vision—not the other way around.

from the beach to the boardroom

Gallup’s State of the Global Workplace (2024) found that 77% of employees are not fully engaged at work, with many lacking clear goals. This lack of direction often leads to inefficiencies in processes and lackluster customer experience. When employees do not understand their role in the bigger picture, it shows in their work.

Risk culture is about direction—where you are going and how you make decisions to get there. But it is also about safeguarding the bottom line and promoting an optimal business model, balancing risk against reward. And that’s exactly where the breakdown in this café’s operations occurred. The employees, without clear goals or a sense of purpose, were simply going through the motions, lacking engagement and making mistakes that harmed both their performance and the customer experience. A significant risk to the café as a whole.

This brings us to the real question: Are we in second line of defense risk management doing enough to build a strong risk culture before it is too late? The answer goes beyond just identifying and calculating risks; it’s about fostering a culture where every employee, from top leadership to front-line workers, understands the risks they face and their role in mitigating them.

Strengthening risk culture requires commitment from all levels of the organization, not just from senior management or the risk department. It is a shared responsibility. Just as the absence of clear direction contributed to poor service at the café, a lack of alignment within a company can lead to missed opportunities and unforeseen risks.

foundational risk culture is not a croc

How can top leadership ensure that every member of the organization is contributing to a strong risk culture?

1. **Lead by Example**
   Senior management must model the desired behaviors. When leadership prioritizes transparency and accountability, it sets a standard for the rest of the organization.

2. **Educate Employees**
   Employees at every level need to understand the risks the company faces and how their role contributes to managing them. Regular training, open communication, and clear expectations help build a risk-aware culture.

3. **Foster Open Communication**
   Employees should feel comfortable discussing potential risks without fear of punishment. An environment where risks are openly addressed leads to better decision-making and a stronger overall strategy.

4. **Set Clear Goals Aligned with Risk Management**
   Everyone in the organization should understand how their personal and professional goals align with the company’s objectives. Clear goals provide direction and ensure that every action taken contributes to the greater success of the organization.

Imagine how this café could have improved its performance if a strong risk culture had been in place.

First, employees would understand the importance of consistent service and the impact their behavior had on customer satisfaction. With a risk-aware culture, the servers might have been more engaged, had clear expectations for their roles, and been empowered to contribute to improving customer experience.

The café could have reduced operational inefficiencies by implementing better training programs and aligning individual goals with the company's mission of delivering exceptional service. For example, the staff could have been trained to anticipate customers' needs--like knowing the ice cream flavors without needing to check, reducing delays and improving the overall experience. By creating a sense of ownership in each employee, the café could have minimized the risk of mistakes—such as overcharging or undercharging—and maximized customer loyalty.

Additionally, as the team's performance improved, the café could have considered expanding, possibly opening new branches with a standardized, risk-conscious approach to service. The result would be not only improved customer satisfaction, but greater market share and enhanced profitability, ensuring that the business scaled effectively while managing risks and opportunities.

risk management is a beach

And in the end, there are two questions that truly help improve risk culture. They have nothing to do with "likelihood" or "severity." It is about your behavior when no one is watching.

As a risk manager, here is the question I would have asked the servers: *Does the way you work—your behavior, your attitude—help you move toward your own personal goals, alongside the goals of the company that brought you here in the first place?*

And to the owner, I would ask this: *Do your decisions truly move the company toward its strategic goal—and do the steps you take along the way reflect the values you claim to stand for?*

Because risk culture is not written in policies—it is revealed in everyday choices, and most of all, in the decisions you make.

Disclaimer: The author used ChatGPT in the editing phase of this article and to structure some content.

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Synopsis

Value at Risk (VaR) has been the cornerstone of risk management, however the concept has been questioned recently due to its failure in risk detection and in capturing tail risk. In this article the history of VaR is explored, its limitations and the recent developments with VaR.

A short history of measuring market risk in banking

by **Nadia** Al Qassab

history of VaR

Undeniably VaR is a risk metric used extensively by risk managers and investment professionals. It simply answers the question: how much can be lost? VaR attempts to answer this question by stating the potential loss in the value of a portfolio over a predetermined time period for a given confidence interval. The shape of the loss distribution, especially in the tail, can push losses much higher than VaR indicates.

Value at Risk was developed in the 1920s and stems from Markowitz's Modern Portfolio Theory which discusses the benefits of diversification. Leavens (1945) developed this theory into a quantitative model which led to the initial VaR. Leavens attempted to portray the financial impact of ten bonds assumed, at the end of the horizon, to be valued at either USD $1,000 or worthless. The portfolio value assumed a binomial distribution.

In 1952, Markowitz and Roy independently published VaR measures that were shockingly similar. Both studies independently suggested selecting a sample of investments and the concept of optimizing risk to return, hence incorporating the covariance between risk factors, hedging and diversification benefits. However, one limitation of this VaR model was the lack of processing power, hence the model remained principally theoretical. William Sharpe detailed this VaR measure in his Ph.D. thesis (1963), which motivated the development of the Capital Asset Pricing Model (Holton, 2002).

The 1970s and 1980s had a dramatic impact on VaR since it moved from theoretical to practical. With the collapse of the Bretton Woods agreement in 1971, and exchange rates beginning to float (creating the largest forward market in the world), Lietaer (1971) detailed a practical model for VaR to measure foreign exchange risk. Since World War II most currencies devalued, hence corporations maintained constant hedges to tackle the risk. In his research Lietaer detailed the procedure of optimizing those hedges by incorporating the VaR measure. This was the first development of the Monte Carlo method employed by VaR.

During the late 1980s JP Morgan developed a firm-wide VaR. This modeled several hundred risk factors alongside a covariance matrix which was based on historical data. This was aggregated to calculate the overall portfolio value and standard deviation. JP Morgan proposed a practical approach to VaR, which allowed the firm to manage risk internally, and other institutional clients expressed their interest in purchasing the model (Holton, 2002).

advantages and limitations of the VaR model

VaR has numerous advantages, such as the ability to promote the loss figure into a single value which is easily interpretable by risk professionals and applicability to numerous asset classes and portfolios. It is now widely accepted by risk professionals and most importantly regulators.

Despite the advantages, VaR poses challenges for risk professionals such as the assumption that returns follow a normal distribution in some VaR types such as the parametric approach. VaR is a short-term measure and does not apply over the long term. The calculation can also be quite complex for large portfolios with many asset classes. VaR is more suited for linear products such as futures and swaps, but does not calculate accurately for nonlinear instruments such as options (Garp, 2020).

> ***One reason for such incidents is that VaR can be calculated using historical data with an assumption that future returns will follow the same pattern as historic returns, hence it is backward looking.***

the current state of VaR

The recent pandemic and other extreme events have caused some trading desks to breach the VaR figure frequently. This is due to VaR's limitations in capturing tail risk and non-linearities, but also companies' selection of a VaR type that is ill-suited to their portfolios. Below are a few of the major incidents:

- 1995: Barings bank's collapse was partly attributed to underestimation of losses by VaR
- 1998: Long Term Capital Management underestimated the correlated risks during a severe stress leading to their collapse.

- 2007: Merrill Lynch experienced daily price deviations and the devaluing of mortgage-backed securities that resulted in the failure of the VaR model in capturing extreme losses due to the use of historical VaR approach.

- January-March 2020: HSBC reported fifteen VaR backtesting breaches, well above the acceptable number of four breaches. This is attributed to the underestimation of risk by the historical VaR model.

One reason for such incidents is that VaR can be calculated using historical data with an assumption that future returns will follow the same pattern as historic returns, hence it is backward looking. Additionally, it is procyclical, meaning that prior to a crisis the VaR is usually underestimated, and post-crisis VaR is overestimated forcing banks to maintain higher capital than necessary.

To address these technical gaps and shortcomings in the VaR model post-2008, regulators introduced stressed VaR (SVaR). As the name indicates, this extension of the model requires banks to maintain additional capital based on a previous period of acute stress. However, it was noticed that during stressed periods the VaR figure increases to the level of the stressed VaR. Under Basel rules, market risk capital requirements equal regular VaR plus stressed VaR, with each multiplied by a scalar that increases with excessive VaR model breaches. As an example of how these effects can compound, in the first quarter of 2020, ABN Amro's VaR multiplier increased from 3x to 3.5x and higher Covid-era shocks were applied to positions, resulting in a 57% increase in capital charges (Risk.net, 2020).

VaR's regulatory future

In 2016, Basel guidelines introduced the Fundamental Review of the Trading Book (FRTB) and in theory it was expected to reform the market risk approach. The FRTB framework revised the boundary between the banking and trading books, ensuring clear distinction between the classifications and more constraints. Additionally, it planned to provide a more transparent calculation of the standardized approach, an alternative to the VaR-based internal model approach.

The internal approach under FRTB suggests replacing VaR with Expected Shortfall (ES), which is similar to VaR but gives more weight to tail losses. One drawback of Expected Shortfall, however, is that it cannot be backtested. The main advantage of ES is that it avoids double counting and results in less volatile capital charges during a crisis.

Due to the backward-looking nature of historical VaR and the simplicity of the standardized calculation many banks are shifting to the standardized approach over internal models, often resulting in an increase in capital charges.

conclusion

Basel regulation and the regulatory banking industry had made remarkable progress with the evolution of VaR by constantly changing the model to capture market developments and risks. However, some limitations remain, such as the limitations to more complex products and non-linear products during volatile markets. Although progress has been made, the search for reliable market risk metric always remains.

Disclaimer: The author used AI to verify information during the research phase of writing this article and cites her references below.

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Synopsis

Risk practitioners should recognize that larger economic forces can outweigh the Fed's interest rate decisions, complicating traditional policy responses to inflation. Efforts to combat inflation, such as raising rates, may inadvertently worsen national debt and introduce new risks. To mitigate these challenges, practitioners should diversify with assets like TIPS, real estate, commodities, and hedged strategies.

The catch-22 in the Fed's interest rate decision

by **Ron** Surz

Figure 1. Sources - Heller, J. (n.d.). "Catch-22" [Book cover, specific edition]. Simon & Schuster. Retrieved from ebay.com; Nichols, M. (Director). (1970). "Catch-22" [Movie poster, promotional image]. Paramount Pictures. Retrieved from amazon.com; CNBC-TV18. (n.d.). Jerome Powell speaking at a press conference [Photograph]. Retrieved from cnbctv18.com.

introduction

The dictionary defines catch-22 as a situation where the solution to a problem is also the problem itself, making it impossible to resolve. Joseph Heller popularized the term in his 1961 novel, where he described the situation of military pilots who, seeking discharge by declaring insanity, had their requests denied on the grounds that only the sane would desire such a release. The book was followed by a movie in 1970. And now the Federal Reserve has its own unique catch-22.

Here's the catch-22 in the Fed's interest rate decisions.

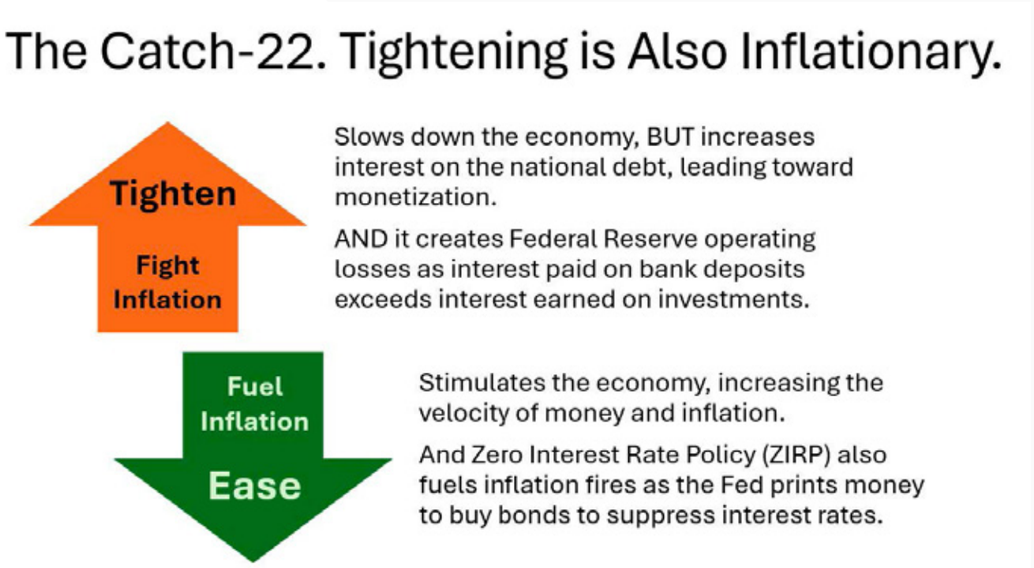

Figure 2. The Fed's Catch-22

trapped in an interest rate vicious cycle

In March and again in May 2025, the Federal Reserve announced that it will leave interest rates unchanged, despite pressure to resume the reductions it started last year. Regardless of the fanfare, this decision does not matter much because much bigger forces are in play. The Fed's decision does not move the needle. Here's where we are today, and where we are heading.

In the last several months the "We are HERE now" arrow in Figure 3 has moved clockwise to "Stock Prices Fall." This decline is blamed on tariffs, but – given the predictability of the cycle – it was destined to happen. President Trump has made it clear that he wants the cycle to move to lower interest rates – ZIRP in the graph. Do we really want to go around this cycle again, and again, and…? Dizzy yet?

Figure 3. Cycle of Fed Decisions

2025 started great, with a 3% return on the S&P 500 in January, but since then the stock market has declined, putting pressure on the Fed to stimulate the economy by lowering interest rates. This was reinforced by President Trump's directive to Chairman Powell to do so.

But the US economy is growing nicely at more than 2% per year. It does not need stimulation, so reducing interest rates will fuel inflation fires.

inflation threats that overhang the economy

There is no doubt that recently enacted tariffs are inflationary and a primary cause for recent stock market declines, but there is also the fact that the US has printed lots of money in the past 15 years, as reflected in the Fed's balance sheet.

Prior to the stock market crash of 2008, the Fed's balance sheet was maintained at a constant $1 trillion. But then money was printed to save the economy – a controversial move that has worked so far, since stock prices skyrocketed and inflation was under control, except for a blip caused by COVID-induced supply shortages.

Warren Buffet observes that quantitative easing (QE) is an experiment of consequence and magnitude that has never been run before. His concern is in its unwinding, because QE cannot be run forever, and it did end – at least for now – in 2022. This is when the money printing ended, and the Fed started unwinding its balance sheet under quantitative tightening (QT). The experiment is gradually and cautiously ending.

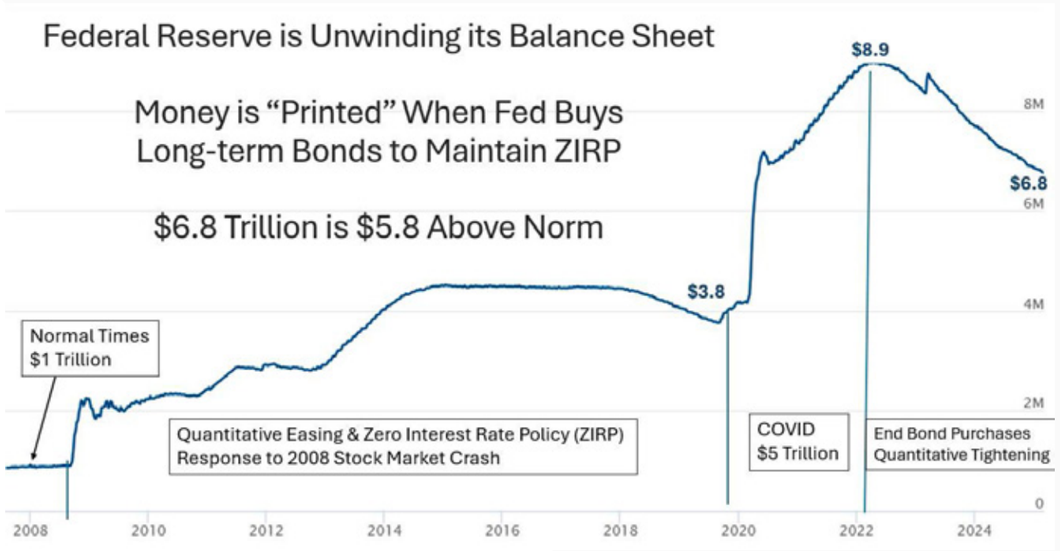

Figure 4. Federal Reserve Balance Sheet Unwinding

But $5.8 trillion remains sloshing around in the economy that will cause inflation if money circulation – or "velocity" – picks up. According to Perplexity AI, velocity will increase during:

1. Economic expansion: During periods of economic growth, consumers and businesses tend to spend money more readily, causing the velocity of money to increase.

2. Higher interest rates: Rising interest rates can increase velocity by reducing real money balances relative to personal consumption, encouraging more frequent transactions.

3. Improved payment systems: The availability of credit and electronic banking can reduce barriers to transactions, leading to increased velocity.

4. Consumer behavior: When consumers prioritize spending over saving, the pace of transactions accelerates, increasing the velocity of money.

5. Inflation: Higher inflation rates are often associated with increased velocity, as people tend to spend money more quickly to avoid losing purchasing power.

6. Technological advancements: Innovations that facilitate faster and easier transactions can contribute to higher velocity.

7. Increased economic activity: More transactions naturally lead to higher velocity.

a delicate balance: rising interest rates expedite an imminent debt spiral

The Catch-22 in fighting inflation by raising interest rates is that this increases payments on the U.S.'s enormous $37 trillion national debt. As the debt swells, the country will be forced to monetize it as did Argentina and Venezuela – wealthy countries that were boxed into a monetary corner.

U.S. taxpayers are currently paying 2.7% on the debt, so $1.1 trillion. That makes it the third largest expense item in the budget. But today's interest rates are much higher than 2.7% so the interest payment is increasing as old issues mature, and new bonds are issued.

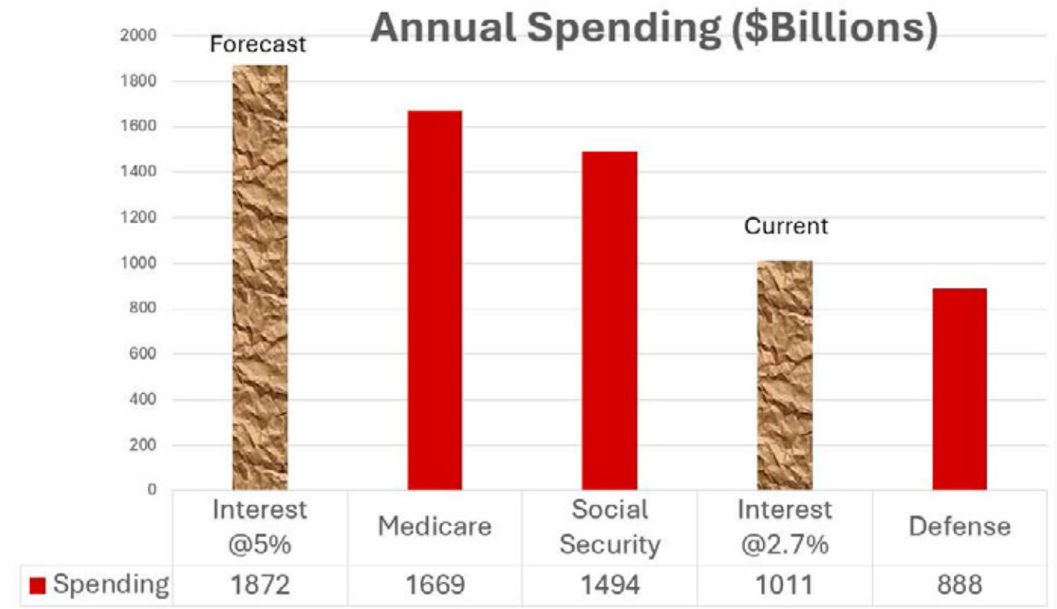

Figure 5. US Federal Government Annual Spending

When interest payments on the debt reach 5%, debt service will be the largest expense in the budget and the deficit (expenditures minus tax revenues) will more than double from $2 trillion currently to more than $4 trillion per year, swelling the national debt.

This could lead to printing more and more money. "Monetizing the debt" this way is when federal deficits are paid by increasing the money supply, thereby paying with money that is diluted (inflated). Quantitative Easing is a form of monetization that has worked out so far because interest rates were controlled under the Fed's Zero Interest Rate Policy (ZIRP).

The Catch-22 is that keeping interest rates low under ZIRP is also inflationary because the Fed needs to step in to buy new Treasury issues. Zero interest rate bonds do not clear the market, so the Fed buys what is required to suppress interest rates.

conclusion

The risk of serious inflation is real and should be anticipated by risk managers. Quantitative easing has created serious inflation threats. The only way out is to increase

tax receipts and reduce government spending, neither of which is in the Fed's purview. Otherwise, serious inflation lies ahead regardless of Fed actions. The good news for older people is that the reckoning might not happen in their lifetimes.

Risk managers can and should prepare for inflation on the horizon, and protect with investments like:

- Treasury Inflation-protected Securities (TIPS)
- Precious metals, especially gold
- Some real estate, like farmland
- Natural resources
- Cryptocurrencies
- Consumer Staples
- Some hedge funds

Protection with TIPS is straightforward – their prices adjust for inflation by design. The other assets have a history of prices that increase with inflation because their value holds up in real (inflation-adjusted) terms. It takes more diluted dollars to buy these assets.

Disclaimer: The author used Perplexity AI in the research and writing phases of this article.

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Synopsis

AI/ML is rapidly transforming risk management across predictive analytics, fraud detection, operational efficiency, and more. Despite their benefits, these technologies introduce risks such as model bias, lack of explainability, and cybersecurity vulnerabilities. Risk managers must enhance governance guardrails, transparency, and continuous oversight to leverage these advancements effectively.

Harnessing artificial intelligence and machine learning: opportunities and challenges for risk managers

by **Shachi** Sayata

introduction

Artificial Intelligence (AI) and Machine Learning (ML) are no longer just futuristic buzzwords. They have firmly entrenched themselves across industries with transformative technological breakthroughs, reshaping processes, decision-making, and operational efficiencies. However, for risk managers, the dual-edged nature of AI and ML introduces both remarkable opportunities and complex risks. This article explores the uses and potential pitfalls of these technologies, emphasizing their practical applications for risk management professionals.

applications of AI and ML in risk management

1. Enhanced Predictive Analytics

AI/ML is revolutionizing predictive analytics by analyzing massive datasets and identifying patterns that traditional methods might miss. In risk management, this is particularly valuable for forecasting financial market movements, detecting credit risk, and modeling stress-testing scenarios.

Example: Banks now use ML algorithms to evaluate borrower creditworthiness by analyzing diverse data sources, including transaction history, spending behavior, and even social media activity. These models can assess risk profiles with unprecedented granularity, improving loan underwriting processes and reducing default rates. (Berg, Burg, Gombović, & Puri, 2020).

2. Fraud Detection and Prevention

ML models excel at anomaly detection, which is critical for identifying fraudulent activities in real-time. By continuously learning from new data, these models can adapt to evolving fraud patterns, offering robust protection against cybercrime and financial fraud.

Example: Credit card companies utilize ML to flag unusual transactions. For instance, if a user's card is suddenly used in a different country for a high-value purchase, the system triggers an alert temporarily blocking the transaction pending verification.

3. Operational Efficiency through Automation

AI-powered tools streamline manual processes, enabling risk teams to focus on high-value strategic tasks. Report generation, regulatory compliance checks, and data validation tasks are increasingly getting automated and more efficient.

Example: Natural Language Processing (NLP) technologies help financial institutions parse through vast regulatory documents to identify compliance requirements, reducing manual workload and ensuring timely adherence to evolving regulations.

4. Scenario Analysis and Stress Testing

AI-driven simulations can model complex, non-linear interactions in financial markets. This enables more robust scenario analysis, allowing firms to better prepare for extreme market events.

Example: Insurance companies employ AI models to predict the impact of climate change on property risks, helping them adjust premiums and reserves accordingly.

risks and challenges of AI and ML

Despite their advantages, AI and ML present significant risks that require careful consideration and mitigation strategies.

1. Model Bias and Ethical Concerns

AI systems are only as good as the data they are trained on. If datasets are biased, the resulting models can perpetuate and even amplify these biases, leading to unfair or unethical outcomes.

Example: A credit-scoring algorithm might deny loans to specific demographic groups if historical data reflects systemic discrimination. This not only harms individuals but also exposes organizations to regulatory and reputational risks.

Mitigation Strategy: Risk managers must rigorously evaluate training data and employ fairness audits to identify and mitigate biases.

2. Lack of Explainability (Black Box Models)

Many AI/ML models, especially deep learning systems, operate as "black boxes," producing decisions without clear explanations. This lack of transparency can make it difficult for risk managers to justify outcomes to regulators and quantify benefits to stakeholders.

Example: If an AI system declines a loan application, the inability to explain the decision could lead to legal challenges and erode customer trust.

Mitigation Strategy: Adopting Explainable AI (XAI) frameworks and prioritizing simpler, interpretable models in high-stakes applications can address this issue.

3. Over-Reliance and Automation Risk

The convenience of AI can lead to over-reliance, where human oversight tends to diminish. This is particularly dangerous if models fail during unexpected scenarios, such as unprecedented market disruptions.

Example: Algorithmic trading systems have caused market flash crashes when they acted on erroneous signals, leading to massive losses in mere seconds. (Kirilenko, Kyle, Samadi, & Tuzun, 2017)

Mitigation Strategy: Establish robust governance frameworks that ensure human-in-the-loop oversight, especially for critical decision-making processes.

4. Cybersecurity Vulnerabilities

AI systems themselves are targets for cyberattacks. Adversarial ML, where attackers manipulate inputs to deceive models, poses a growing threat to the integrity of AI systems.

Example: In fraud detection systems, adversaries could exploit weaknesses by introducing deceptive patterns, causing false negatives and allowing fraudulent transactions to go undetected.

Mitigation Strategy: Adopt adversarial training techniques and regularly stress-test models against potential attack scenarios.

AI literacy and practical steps for risk managers

To effectively harness AI/ML while mitigating associated risks, risk managers must adopt a proactive and informed approach. This includes developing technical literacy, establishing robust governance, and fostering collaboration across stakeholders. The following integrated framework outlines key considerations and actionable steps:

1. Understand and Challenge Model Assumptions

- Know the underlying logic, limitations, and assumptions behind AI-driven models.
- Select explainable solutions where possible to ensure transparency and accountability.

2. Develop a Robust AI Governance Framework

- Define clear roles and responsibilities for AI oversight.
- Set standards for data quality, model validation, and performance monitoring.
- Engage with global regulatory developments to ensure ongoing compliance.

3. Implement Continuous Monitoring and Adaptation

- Regularly monitor models for performance degradation and data drift as market conditions evolve.
- Use monitoring insights to recalibrate models and maintain alignment with risk appetite.

4. Prioritize Ethical and Responsible AI Use

- Evaluate the fairness, privacy, and ethical implications of AI applications.
- Conduct bias audits and ensure that AI decisions do not reinforce systemic inequities.

5. Invest in Talent, Training, and Cross-Functional Collaboration

- Build AI literacy across risk teams to enhance their ability to evaluate and challenge models.
- Encourage close collaboration between risk professionals, data scientists, and compliance teams.

6. Engage Regulators Proactively

- Involve regulatory bodies early in the development of AI solutions to anticipate compliance expectations.
- Promote transparency around model behavior and decision-making processes.

7. Adopt a Balanced, Human-in-the-Loop Approach

- Use AI to augment, not replace, human judgment—especially in high-stakes or ambiguous scenarios.
- Empower analysts and managers to override or question automated outputs where necessary.

conclusion

By being proactive with a balanced approach that combines governance, transparency, and continuous oversight, risk managers can unlock the maximum potential of AI while safeguarding their organizations against emerging threats.

As these technologies evolve, their success in risk management will depend not just on their technical capabilities but also on the ethical and strategic foresight of the professionals implementing them. The journey may be complex, but the rewards – a more resilient, efficient, and informed risk management landscape – makes the journey worth it.

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