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Maintaining Resilience in a Rising Rates Environment

Addressing ALM uncertainties during inflection points in the business cycle

Executive Summary

During times of economic volatility, financial institutions often confront multiple, uncertain paths. Market signals can at times be confusing, and executives need to be able to consider a broad range of potential variables that impact the income statement and balance sheet in a variety of ways.

Bank executives in charge of asset and liability management (ALM) need to be armed with the tools to evaluate a range of potential scenarios, in order to be prepared for the next economic crisis. Specifically, they need tools that allow for the simultaneous evaluation of multiple possible scenarios and events, to potentially reveal something unexpected.

In this paper, we offer some ways for ALM executives to address economic uncertainty by employing multi-variable scenario analysis. We provide suggested variables that should be considered, and two example scenario analysis models that address the most common areas of risk: net interest income, and economic value. In the end, we demonstrate that those leaders that are well-positioned to drive strategy through an alignment of relationship pricing, lending, portfolio and capital management disciplines

around a consistent view of risk will ultimately win the day.

Introduction: Preparing for the crisis around the next turn

You may be familiar with the famous test track at Walt Disney World's EPCOT Center. The attraction allows visitors to design their own Chevrolet-branded vehicle, and then put the car through its paces on a simulated test track. You swerve to make sure your brakes, tires and overall handling are adequate to avoid obstacles. A number of environmental variables, such as extreme temperature changes, are introduced to ensure that the occupants remain comfortable, and the engine is not adversely affected. Rough terrain, hills and other challenges are posed to test your vehicle's ability to perform smoothly. Participants can even pretend they are a crash test dummy in a simulated crash.

As drivers, we don't expect to personally experience any of these situations often, if ever. But it gives us comfort to know our vehicles can withstand the most extreme challenges just in case we ever have to face them. This is so important that car manufacturers have their vehicles independently rated for safety

and spend millions in advertising dollars to publicize these ratings. It's worth questioning whether we apply the same level of rigor in ensuring our financial institutions can withstand the extreme conditions they may have to face?

While many bankers would argue about whether the level of regulatory oversight is appropriate or excessive, most people would agree the banking industry is presently in a strong and stable position. But individual institutions still run into trouble even in the best of times, and often don't see it coming down the road until it is too late. Each of the economic shocks of recent decades—including the COVID-19 recession, the 2008 mortgage crisis that precipitated the "Great Recession," the recession following the "dot-com" bubble and September 11th attacks, and the 1990 oil price shock—was unexpected, and unique. In any of these cases, broader and more diligent scenario analysis may have helped institutions protect themselves from the most adverse effects. But how can banks know what to test for, when testing for the last crisis rarely helps prepare for the next?

Savvy bankers are evolving strategies to maintain profitable growth in the face of new challenges, including the disruptive competition and evolving customer expectations that define the anticipation *economy*¹. A multi-scenario view of interest rates, credit, and liquidity is critical to promote the institution's resilience in times of change. A willingness and ability to access and analyze a mosaic of data points is what distinguishes top-performing institutions from their competitors, which are content to conduct traditional stress testing primarily designed to avert the last crisis.

Those who can drive strategy through an alignment of relationship pricing, lending, portfolio and capital management disciplines around a consistent view of risk will win out. The advent of current expected credit loss (CECL) accounting has materially altered the credit insights available to reserve stakeholders—re-establishing the critical links among pricing, reserves and ALM—and now leveraging and building

on these capabilities is a strategic imperative. Institutions have a unique opportunity to evolve their capabilities, break down functional silos and increase enterprise resilience in the face of the unknown. Just like at the Disney test course, you never expect that your institution will get to the brink of failure, but preparing and understanding the potential causes of future crises will leave you better prepared to address all matter of challenges.

Current Environment and Macroeconomic Challenges

“In economics things take longer to happen than you think they will, and then they happen faster than you thought they could.”
- Rudiger Dornbusch

The economy is at an inflection point.

The market has become comfortable with historically low rates for a historically long time—since the Great Recession of 2008-09. Now these rates are rising rapidly. It is unknown how far the Federal Reserve will go in raising rates to combat inflation, and how long rates will stay elevated. This moment of uncertainty—this inflection point—introduces an element of volatility in banks' strategic thinking, particularly in asset and liability management (ALM).

During the inflection point of a business cycle, the most important tool organizations have at their disposal is the ability to run a wide variety of “what if?” scenarios. These scenarios must begin with the current state of economic affairs as a baseline.

To illustrate the current state, here are a few economic indicators that are signaling our arrival at an inflection point:

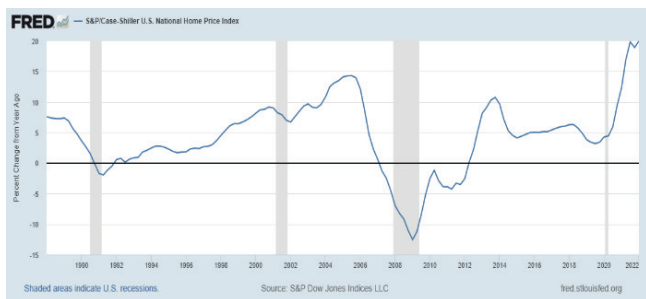
» **The Home Price Index reached an all-time high, but is now falling off quickly:** Mark Zandi, chief economist at Moody's Analytics, is predicting

¹ Anticipation Economy as defined in our webinar: <https://info.bai.org/optimizing-credit-processes-for-revenue-growth-webinar.html>

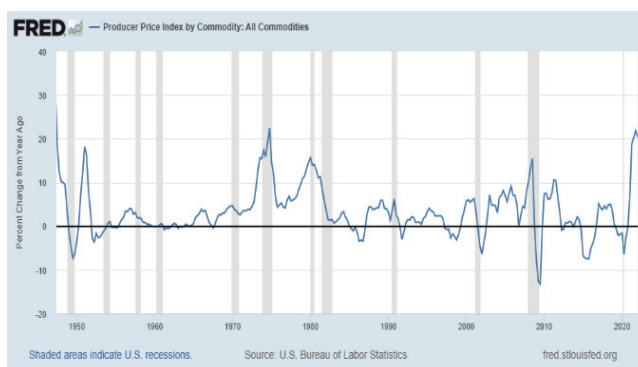
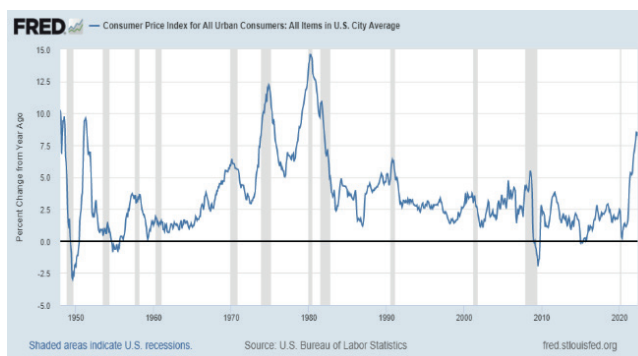
a housing market correction sooner rather than later, as red-hot home sales seen during the pandemic have come back down to earth. He expects declines in the low single-digits, although they can be as high as 20% in some of the most over-valued markets in the country, like Boise, Idaho and Charlotte, North Carolina.



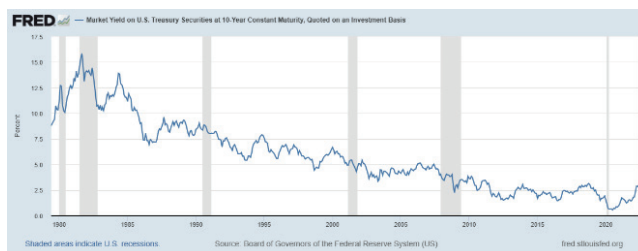
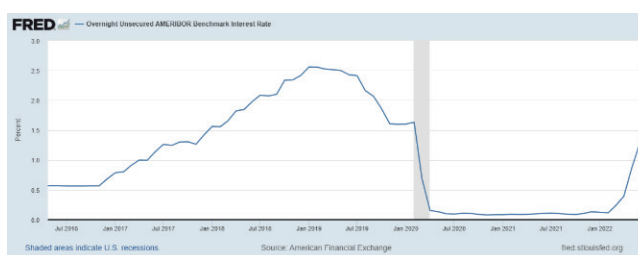
A crash is what happened back in the financial crisis — that was a crash,” Zandi says. “That’s not what we’re going to have here. The next thing to happen will be for house prices to adjust and we will see some price declines likely nationwide.



» **Inflation continues its torrid pace**, as both the consumer price index and producers price indices for all commodities maintain the highest levels seen in decades. From late 2021 through the better part of 2022, inflation has been on a hot streak not seen since the early 1980s. A confluence of factors, from COVID induced supply chain disruption, low unemployment, the war in Ukraine, and pandemic-weary consumers seeking an escape from lockdown are being felt in all areas of the economy. With the Federal Reserve taking aggressive rate hike actions to reduce these inflationary impacts, it is imperative for financial institutions to manage their balance sheet to ensure sufficient earnings power to sustain through this challenging economic cycle.



» **Short and Long term rates are on the rise**, driving down auto and home sales. In another indicator of a weakening economy the pace of deposits is slowing, signaling that deposit betas (the rate of deposit runoff) will take a hit, considering that deposit rates are the last to rise in a rising rate environment.



Understanding the impact of a range of conditions applied to the balance sheet can inform strategic decision-making, but for it to be useful in the asset liability management arena, bankers need to consider a plethora of assumptions and risks simultaneously. During a time of rising rates, high inflation and impending recession, these risks include, but are not limited to: worsening delinquencies, rising charge offs, deposit runoffs, declining loan volume (especially in the area of mortgage refinancing) and a migration towards adjustable-rate financing. Each of these risks all have well understood implications on their own, but when applied in concert their potential range of impacts on net interest income and shareholder value is quite complex and in some cases, counter intuitive.

With the current economic picture serving as background, let's review the assumptions ALM leaders should consider employing during an inflection point in the economic cycle.

Preparing for the Crisis to Come

Breaking down silos

Historically, the Asset-Liability Committee (ALCO), credit, finance and accounting functions have each performed an individual analysis of enterprise risk from their respective points of view. This siloed approach to scenario analysis is largely inefficient and ineffective, as it wastes time and resources without fully considering all potential areas of risk.

One exception is the annual stress testing exercise, which often forces the bank to engage in cross-functional collaboration strictly out of necessity. However, enterprise-level stress testing is typically performed only to meet regulatory requirements and rarely gets embedded in the organization's strategic planning.

A bank's ability to break up functional silos, and collaborate to embed resilience in its capital and strategic plans is the starting point to ensuring capital is allocated, deployed and monitored as intended,

and incentives provided to the lending and investing operations are aligned with the strategy set forth by management.

We include below the range of assumptions and impacts that should be tested holistically to assemble a mosaic of evidence on the range of potential scenarios that an institution may face at any point in time. The joint analysis of all these factors can help build resilience and provide answers on a range of questions, including: Do you understand the impact of deposit run off in a particular credit risk scenario, concurrent with increased loan origination activity? What will be the impacts to net interest income? How will the scenario impact the economic value of the institution for shareholders and their ability to receive future dividends?

Establish testing assumptions

ALCO needs to consider a wide range of variables in establishing a robust scenario analysis program. It's important to consider the broad first, second and third order impacts that these variables can have, both individually and collectively, on the bank's financial performance and economic value. Following is a list of testing assumptions—and questions to ask—that bankers should consider to better prepare for the next economic crisis:

» **Investments:** Typically, a sudden rise in interest rates will reduce the value of an investment portfolio. Although such revaluations don't always impact the income statement, it may have some effect given the available for sale (AFS) allowance accounting standard introduced by the Financial Accounting Standards Board (FASB) in its *Accounting Standards Update (ASU) No. 2016-13, Topic 326, Financial Instruments—Credit Losses*², which also established the Current Expected Credit Losses (CECL) accounting requirements and methodology. Regardless, a devaluation will reduce available capital via the accumulated other comprehensive income (loss) account.

² Accounting Standards Update (ASU) No. 2016-13, Topic 326, Financial Instruments—Credit Losses, Financial Accounting Standards Board. <https://fasb.org/Page/ShowPdf?path=ASU+2016-13.pdf&title=UPDATE+2016-13%E2%80%94FINANCIAL+INSTRUMENTS%E2%80%94CREDIT+LOSSES+%28TOP-IC+326%29%3A+MEASUREMENT+OF+CREDIT+LOSSES+ON+FINANCIAL+INSTRUMENTS&acceptedDisclaimer=true&Submit=>

Question to consider: Since AFS securities are recorded on the balance sheet as mark to market, you may experience rapidly declining valuations in your portfolio. Are you aware of the capital (and now P&L) implications for your bank?

- » **Prepayment:** Rising interest rates often have a dampening effect on prepayment activity, as borrowers tend to pay off higher-rate loans more quickly than those with below-market rates. On the balance sheet, this behavior will extend the estimated duration of prepayable assets, potentially impacting multiple areas of a portfolio. Considerations may include reserving a larger loss allowance and challenges to existing hedge relationships.

Question to consider: Is now the time to consider using a multi-layer portfolio hedging approach to dampen the impact of reduced prepayment expectations? For more information on this approach, see [this recent FASB guidance](#)³.

- » **Liquidity:** During the pandemic, deposit growth reached near-record levels. But as rates rise, pandemic relief measures expire, and the potential for recession is in the air, deposit growth rates are falling just as rapidly.

Question to consider: What would be the impact on the bank's liquidity profile of large deposit run offs combined with stagflation and longer than expected average loan duration? Is now the time to reevaluate your contingency funding plan?

- » **Loan Loss Provisions:** In a post-CECL environment, the combination of rising rates and extended duration of assets (as noted above) can lead to higher loan loss provisions. Under CECL, adjustments of allowance for loan loss now impact the income statement immediately, and have capital reserve implications. In addition, the new AFS guidance requires larger credit adjustments as unrealized losses increase.

Question to consider: Are you prepared to reserve larger allowances for loan losses as rates rise and durations increase?

- » **Balance Sheet Sensitivity:** Spiking interest rates affect institutions in different ways. During times of shock, organizations are often caught off-guard, depending on the relative sensitivity of various aspects of the balance sheet.

Question to consider: Is your institution more sensitive to interest rate deviations on the asset or liability side of the balance sheet? How sensitive are you to economic-induced shocks like deposit run-offs, prepayments and declining loan growth?

- » **Hedging⁴:** Organizations implement Interest rate hedging practices to offset the effects of rate changes. However, often these programs are established without considering the potential effects of dramatic, short-term rate increases. Hedging strategies that are out of alignment with real-world scenarios are ineffective and can result in detrimental income statement impacts.

Question to consider: Have you performed a shock analysis on your interest rate hedging strategies to assess your readiness for future rate increases?

³ ASU No. 2022-01, March 2022, Derivatives and Hedging (Topic 815), Fair Value Hedging—Portfolio Layer Method, Financial Accounting Standards Board. <https://www.fasb.org/Page/ShowPdf?path=ASU+2022-01.pdf&title=ACCOUNTING+STANDARDS+UPDATE+2022-01%E2%80%94DERIVATIVES+AND+HEDGING+%28TOPIC+815%29%3A+FAIR+VALUE+HEDGING%E2%80%94PORTFOLIO+LAYER+METHOD&acceptedDisclaimer=true&Submit=>

⁴ Positioning firms for resilient financial performance - <https://www.chathamfinancial.com/insights/positioning-firms-for-resilient-financial-performance>

Two Example Scenarios

To illustrate how financial institutions may prepare for economic shocks in a rising rate environment through dynamic scenario analysis, we offer two example scenarios. Both will be run against our baseline proxy of a typical mid-sized banking institution, as follows:

Baseline Sample bank size and portfolio:

Our sample dataset mimics a bank with \$18 billion in assets, a mixed portfolio of investments, commercial real estate (CRE), residential and consumer loans, and a range of floating and fixed rate instruments. The bank is funded primarily through deposits and a good portion of equity capital.

Total Assets: \$18 billion

Investments:

- US Treasury bonds: \$22 million
- Mortgage-backed securities: \$1.2 billion
- Municipal bonds: \$3.5 billion

Loans:

- CRE: \$10.5 billion
- Residential Mortgages - Fixed: \$2 billion
- Consumer: \$1.5 billion

Deposits:

- Non-maturing deposits: \$14 billion
- Time Deposits: \$3.5 billion

Borrowings:

- Repurchase agreements: \$78 million
- FHLB advances: \$600 million

Sample shocks were applied to the balance sheet simultaneously

With the expectation that an economic inflection point will have multiple impacts on the bank's financial condition, from credit quality to liquidity, we next applied the following assumptions to two scenario analysis models within four separate interest rate model scenarios (baseline, baseline +300bps, stagflation, and next cycle recession):

1. The *ZM Prepayment model*⁵ was used as a starting point for each scenario.
2. Increased deposit runoff assumptions were applied to both the stagflation and next cycle recession scenarios.
3. A reduced prepayment assumption was applied to the most severe scenarios (stagflation and next cycle recession).
4. Credit loss assumptions were applied to both the stagflation and next cycle recession scenarios (using median CCAR severely adverse percentage loss rates as a benchmark).

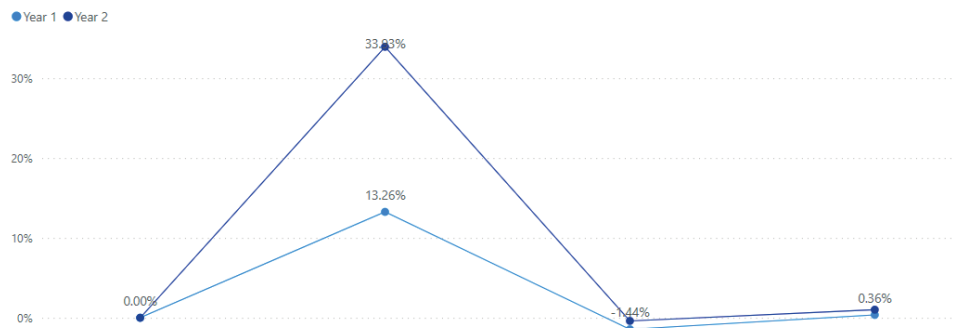
The ability to apply multiple assumptions simultaneously in each scenario allowed us to quickly gauge the first, second and third order compounded effects over a two-year time period within two scenario analysis models: a Net Interest Income (NII) Analysis, and an Economic Value of Equity (EVV) Analysis. What follows is a discussion of these results:

⁵ ZM Financial Systems' Unified Total Prepayment (ZMUTP) model treats different collateral types equally under a unified framework and projects both types of prepayments (voluntary and involuntary) simultaneously (hence the name Unified Total Prepay).

1. Net Interest Income Analysis

An NII analysis is used to account for the range of impacts that could materialize from a rapid change in interest rates. For our analysis, we juxtaposed a baseline scenario with one where we experience a 300 basis point rate hike but do not enter a recession (referred to here as the “Cinderella” scenario). This is then compared with a “next cycle recession” scenario, where rates are generally down across the board but long-term rates remain somewhat higher than short-term rates, and finally, with a “stagflation” scenario, which is a recessionary period marked by persistently high inflation, where long term rates rise rapidly in the first year before stabilizing in year two.

Net Interest Income Sensitivity



Year	Base	+300	Next Cycle Recession	Stagflation
Year 1				
Net Interest Income	839,357,225	905,431,812	832,162,002	841,152,089
Net Interest Margin	4.25%	4.60%	4.28%	4.34%
NII Sensitivity	0.00%	13.26%	-1.44%	0.36%
Year 2				
Net Interest Income	920,470,967	1,117,047,693	918,201,142	926,329,764
Net Interest Margin	4.43%	5.35%	4.56%	4.55%
NII Sensitivity	0.00%	33.93%	-0.39%	1.01%

a. Cinderella Scenario:

In the first scenario, the effect of higher rates is felt immediately. Prepayments do slow a bit, but since interest rates have been low for a long period of time, this slowdown is minimal. In year one, the effect is relatively small because of the preponderance of fixed rate assets in the portfolio. The increase is more significant in year two due to new originations with much higher yields.

b. Next Cycle Recession Scenario:

In the second scenario, prepayments fall by half compared to baseline, while deposits run off at twice the baseline rate and are replaced by deposits with a higher cost of funds. When combined with the higher cost of credit, it results in a reduction in net interest income, although not as drastic as initially expected. The lower prepayment rate and preponderance of fixed rate assets helps the bank retain some higher yielding loans on the books, maintaining margin in year one. In year two, elevated longer term rates help reduce the margin impacts despite a higher cost of funds.

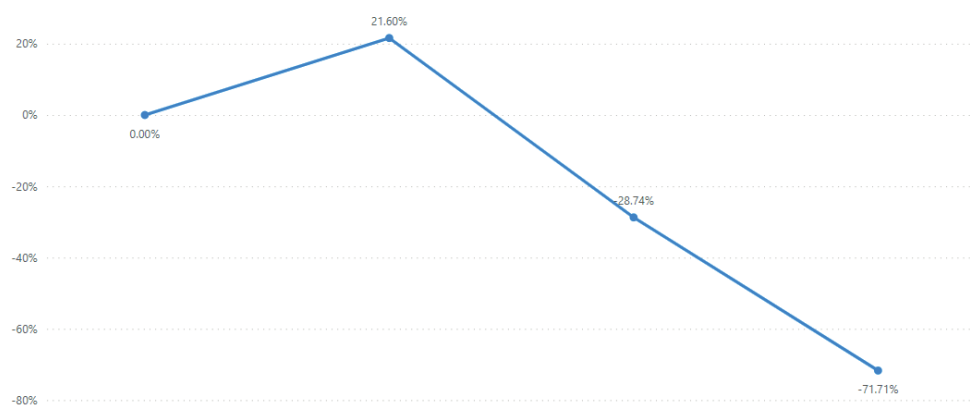
c. Stagflation Scenario:

In this scenario, prepayments are 75% of baseline, while deposits run off at 150% of the baseline rate and are again replaced with higher cost funding. The combined impact of these and the higher cost of credit leads (somewhat counterintuitively) to a slight increase in NII. The reasons lie with a largely fixed interest earning asset base that performs better than the previous scenario based on lower prepayment assumptions, and a more modest increase in deposit runoff keeps the cost of funds lower than in the next cycle recession scenario. This results in a small NII gain in the first year, and a tripling of that gain in year two.

2. Economic Value of Equity Analysis

An EVE analysis is useful in determining the amount of shareholder value that may be gained or lost based on differing economic scenarios and management assumptions. Running the same scenarios as in the NII Analysis, EVE is impacted by the rate of discount used to apply net present value (NPV) to both the asset and liability sides of the balance sheet.

Economic Value Sensitivity



	Base	+300	Next Cycle Recession	Stagflation
EV Assets	20,757,218,759	19,394,174,870	20,084,996,058	19,032,365,315
EV Liabilities	18,585,719,402	16,753,683,529	18,537,559,984	18,418,156,468
EV Equity	2,171,499,357	2,640,491,341	1,547,436,075	614,208,846
EV Sensitivity	0.00%	21.60%	-28.74%	-71.71%

d. Cinderella Scenario:

In our first scenario, we see a spike in EVE as the liability side of the balance sheet is much more sensitive to rate changes than the asset side.

e. Next Cycle Recession Scenario:

In the second scenario, we observe that the shock on the liability side is much less pronounced than in the Cinderella scenario. The impact on the asset side is due to the extension of loan duration as prepayments are reduced, and the increased cost of credit eats into asset cash flows.

f. Stagflation Scenario:

In our final scenario, we observe the largest drop in EVE driven mostly by asset side valuations. The higher rates seen in year one and beyond will have the effect of driving down asset values, as adverse economic conditions (including rising unemployment) place additional stress on prepayment activity and raise credit risk. On the liability side, we see a small drop in value compared to baseline in part due to the decay rates assumption where funding is replaced by higher cost of funding resources that get discounted at a higher rate.

By running both scenario analyses, ALM executives can better understand the range of impacts from applying a wide set of variables and use those results to ask more refined questions in response to real world sensitivities. The information gathered can then be used to guide strategic planning activities— helping management maximize the upside for shareholders while minimizing downside risk to the institution.

Conclusions and Next Steps

Scenario analysis is a valuable exercise to help financial institutions understand their risk tolerances and limits and evaluate how they will likely perform under extreme economic conditions. This allows banking leaders to **plan more effectively and proactively address potential issues before they arise**.

During periods of higher-than-average market volatility, it is useful to **test your institution's resilience under a range of scenarios**. Although our banking system has a well-developed regulatory framework to test for resiliency, senior executives would be well advised to consider a wide variety of scenarios, including the potential impact of rising rates on **net interest income** and **economic value**.

Executive management's ability to quickly and accurately answer complex questions pertaining to the balance sheet has a direct correlation with the institution's resilience in times of stress. To be able to answer these complex questions, scenario analysis must be able to **consider layered levels of assumptions and variables simultaneously**. Expanding collaboration across functions is the key to generating deep insights that can help executives manage through a wide range of economic challenges, such as those we are experiencing today.

To learn more about using multiple economic variables to test for your institution's resilience in times of stress, contact us today.

Further Reading

Why you should merge liquidity stress testing and Interest rate risk (IRR) - <https://www.moodyanalytics.com/articles/2022/why-you-should-merge-liquidity-stress-testing-and-irr?cid=YJZ7YNGSROZ5414>

Positioning firms for resilient financial performance - <https://www.moodyanalytics.com/articles/2022/positioning-firms-for-resilient-financial-performance-in-any-rate-scenario>



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