

VOLATILTY



*Almost everyone
is expecting rates to rise
gradually—don't blindly
follow the herd*

BE PROACTIVE

BY MAX J. RUDOLPH

The business cycle has evidently not been tamed.¹

—Carmen M. Reinhart and Kenneth S. Rogoff

INTEREST RATES ARE A KEY COMPONENT in the complex adaptive system known as the global economy. The system changes constantly as elements interact. Central bankers make well-intentioned moves, natural disasters occur, and speedy computerized markets connect, all potentially leading to unintended consequences that are clear only in hindsight.

Going forward, from an environment where central bankers have manipulated currencies and interest rates, volatility is expected but directions are unclear. How life insurers should proactively anticipate these changes using stress tests was a key component of a recently published research paper titled *Transition to a High Interest Rate Environment: Preparing for Uncertainty*.² This article will expand on some of the key findings of the paper.

An individual is unlikely to anticipate the cause of the next crisis. It will probably be something new. Regulators obsess over previously encountered issues while new issues emerge. Stability breeds instability, and risks hide in the dark.³ Those who load up on leverage during good times set themselves up to fail during periods of stress. High debt levels by individuals, corporations, and governments all tend to be leading indicators of trouble brewing. This highlights the importance of resiliency: developing an ability to survive any specific environment and create a relative advantage against competitors going forward. Bend, but don't break. Doing so requires, first of all, a deep understanding of the risk exposure currently on the books and being marginally added by new business. It also requires knowledge of a firm's current culture and capabilities.

Countries most at risk for disruptions are developing economies with externally provided capital that is very mobile. Money floods in to create a boom and leaves just as quickly during the bust phase of the cycle.

Interest rates are a long-recognized risk to institutional investors, but common techniques and rules of thumb have distracted risk managers from diving into new risk exposures tied to the current environment. Over the past 30 years, rates have generally trended down. At times in our history, deflationary pressures have been strong, and some European risk-free rates are currently below zero.

Today's interest rate environment seems unique, with active fiscal and monetary policies and leverage high in public and private sectors. The great risk in today's market is the uncertainty of interest rate movement given that both directions bring challenges. How are companies dealing with this risk, and could techniques improve? How can a practitioner with limited resources provide value to stakeholders?

Why Interest Rates Could Rise

Many market participants have been waiting for interest rates to cycle up for many years. Here are some reasons they may finally be right.

- Rates cycle: They have been going down for a long time, so they are due to rebound.
- The Federal Reserve Bank has used its toolbox to keep rates low, so by unwinding previous stimulus to clear the system, interest rates would naturally increase to an equilibrium rate.
- The federal government has run deficits for many years. Historically, this scenario eventually leads to higher interest rates.
- Many countries, including the United States, have entered a currency war where central banks seek to export deflation by devaluing their domestic currency. This is an attempt to grow exports and add domestic jobs, but when widely practiced can lead to a spiral of uncertainty. When a country's debt-to-GDP ratio becomes high—as it is now in many countries—the likelihood of a financial crisis increases. Specific triggers and

timing are impossible to pinpoint; the timetable depends on trust in the financial system and cognitive biases.

A problem as it relates to most stress tests is that once rates start to move, it is hard to manage how fast they change. They could spike quite quickly. In the survey portion of the research project, few life insurers were testing increases that exceeded 5 percent above the starting point. This willful blindness leaves them susceptible to unexpected outcomes if rates rise more than that.

Why Interest Rates Could Stay Low or Fall Further

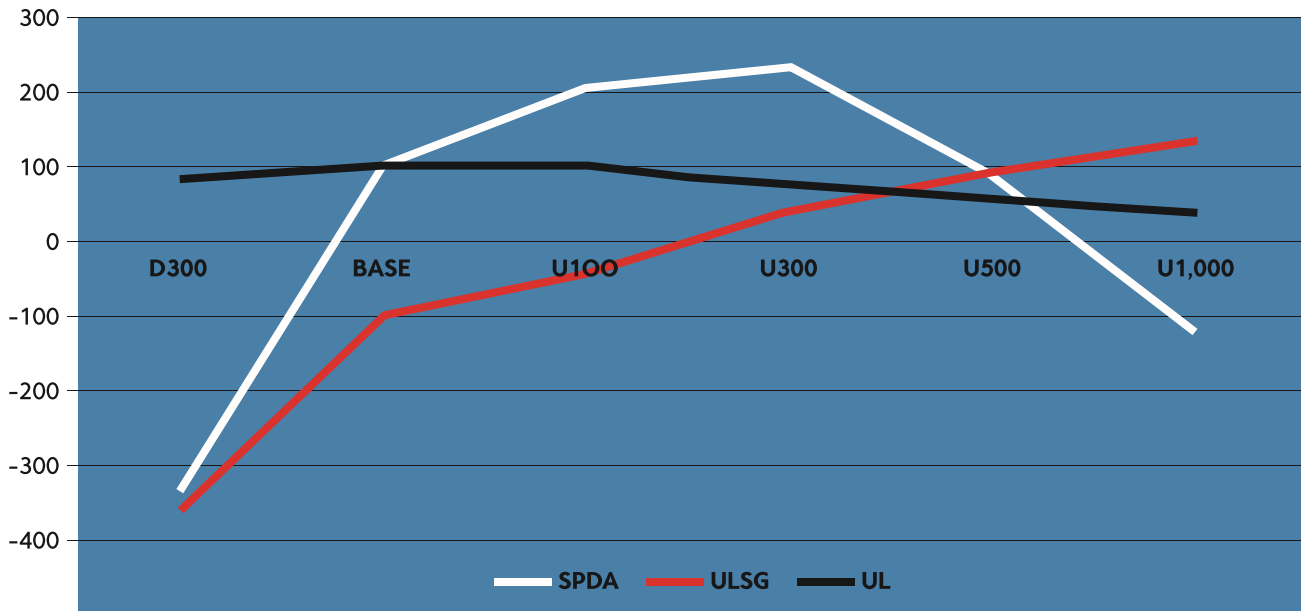
Only a few vocal contrarians have been sounding the alarm about continued low rates, but these risks are much more threatening to savers like insurers, retirees, and pension plans. While the reader has likely thought about reasons for rates to increase, arguments for the risk of continuation of low rates should also be considered and consciously managed:

- Supply and demand dictates that interest rates don't rise without nominal growth.

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CHART 1—Value of aged block of business using consistent methodologies and normalizing base scenario to 100



Source: *Transitioning to a High-Interest Rate Environment*

- Growth may revert to the low rates (near zero) found prior to a series of positive events that occurred over the previous 300 years across three industrial revolutions.
- The velocity of money is at generational lows as people safeguard money due to their personal situations (if their mindset switches to a concern about trust in the financial system, this same statistic could spike, driving high levels of inflation).
- Japan has had low rates for 25 years. Other developed countries are following a similar path of governmental interventions with limited success.
- Demographic trends show aging populations in developed countries, with some shrinkage in overall occupancy. In addition, the elderly tend to spend on services rather than growth-driving products.
- The costs ignored by accounting regimes in the past due to using scarce resources and polluting the planet will be recognized and will slow growth.
- The costs associated with changes in climate will slow growth.

When interest rate levels make it hard to meet nominal interest rate guarantees, savers have a tendency to reach for yield, buying alternative asset classes and accepting bets on future spreads or the shape of the yield curve. Some pundits believe we are experiencing the precursors of this scenario today.

When lots of investors enter an asset class simultaneously, bubbles tend to form—bubbles that burst when these same investors move on to other asset classes. No one wins in this scenario. It is said that a spike in interest rates is a challenge, but a long-term low-interest-rate scenario is a death sentence for life insurers and other savers that risk managers can't afford to ignore.

Best Practice Stress Testing

The research paper mentioned above addressed issues common to life insurers, but other providers of capital (net savers), such as pension plans and individual investors, would have similar findings. Companies tend to rely too much on regulatory scenario tests rather than devising their own tests based on unique exposures.

Modelers can leverage the required tests with a few more that stress specific risks. The modeler's job is to understand the nuances of the risk exposures accepted, so not all scenarios need to be shared up the chain of command—just the ones consistent with the firm's risk appetite, tolerances, and limits. When sharing results with management, the story is more important than the model. This starts with initial product testing. Too often, a long-lived product is priced using rules of thumb without longer-term accountability for the individuals who designed it.

When stochastic analysis is considered, risk managers should consider any model shortcomings based on the current environment or the parameters of the generator. Stochastic interest rate generators can provide useful analysis of possible scenarios but should not be assumed to cover all future scenarios. The NAIC generator utilized for regulatory purposes by life insurers is a good example. It mean-reverts to historical rates and does not support negative rates, so from the current low-rate environment, scenarios tend to rise. These types of scenarios are best-case results for many insurance products. While the risk manager might not think a deflationary scenario realistic, many European rates are currently negative. No sympathy should be given to modelers who have not at least tested their software for negative interest rates.

Interest Rate Volatility

Each block of business is unique. Multiple tools should be considered when testing interest rate scenarios, employing metrics that cover both earnings and cash flows. Higher order statistics, graphically presenting metrics such as convexity in addition to effective duration, should be encouraged. Layering deterministic scenario results graphically on top of sorted stochastic results can provide useful information about the current environment.

Perhaps the greatest risk to economic well-being for savers is when a liquidity-driven recession leads first to deflation, then to an inflationary spike. Dissipation of trust in the financial system could follow aggressive government monetary and fiscal policies, leading to sharp increases in the velocity of money and high inflation. Value can be added from thinking qualitatively about this potential future environment as the many interactions between variables and market discontinuities mean that models are unlikely to predict actual outcomes.

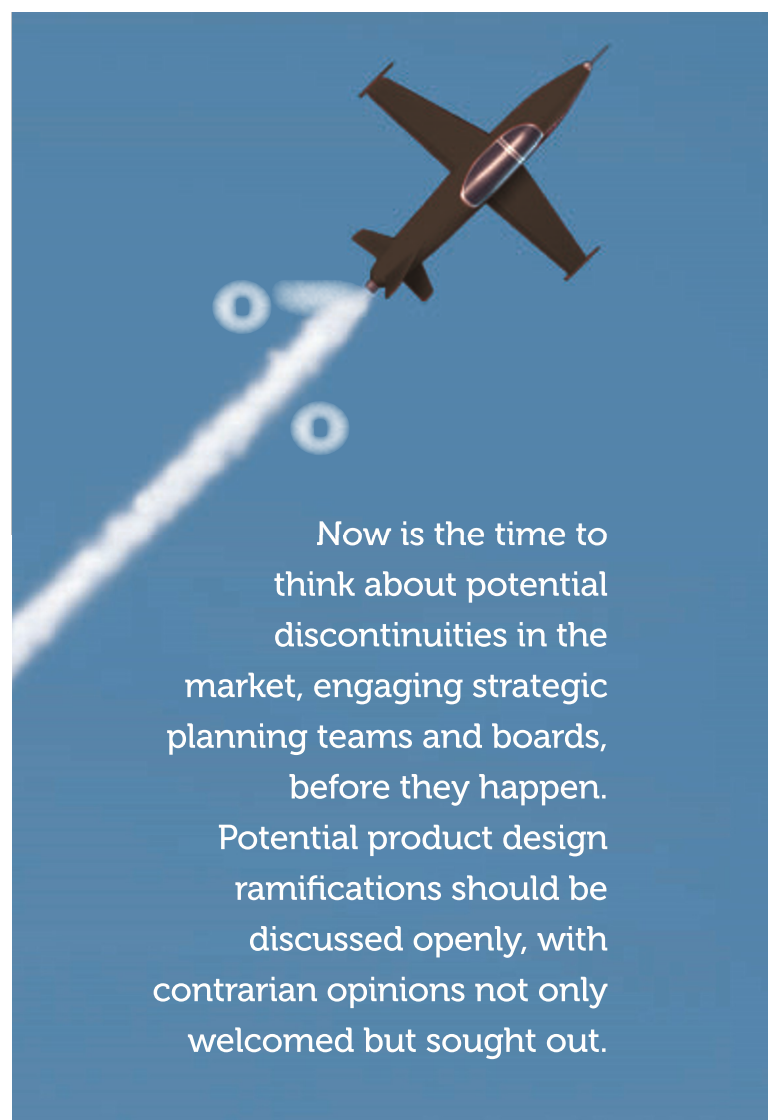
Impact on Insurance Products and Other Savings Tools

From today's base of low nominal interest rates, nearly all products benefit from a slow rise in rates. Some, like long-term care or a defined benefit pension plan (payout annuity), may also perform well when rates rise quickly. Other products, especially those with disintermediation risk associated with surrenders, will experience capital losses when selling assets to meet requests for funds from policyholders.

Low rates are a different story, with almost universal systemic challenges due to underlying nominal interest rate guarantees. Regulators could proactively allow these guarantees to reset periodically on long-lived products or be driven by real rates rather than nominal rates. Buying derivatives is costly but can provide temporary relief. Liquidity and market availability issues may come into play over longer periods. Derivative markets may cease to trade if uncertainty becomes too great. Some are investing shorter than liability benchmarks, assuming rates will soon trend up. It does not appear that these "bets" are being reflected in incentive schemes.

A different type of risk is associated with products where regulatory approval is needed for prices that reset annually. Products like major medical or homeowner's insurance can suffer from a form of basis risk, as approval of premium increases can lag actual inflation. The recent movement in gasoline prices has created another form of basis risk as mileage driven has been much more elastic as prices fell, leading to greater mileage driven and greater claims than expected.

Payout annuities such as defined benefit pension plans may offer cost-of-living protection, but usually individual retirees retain the inflation risk. Guarantees on payout annuities are provided by the federal government (Pension Benefit Guaranty Corporation) or a life insurer backing the plan. Social Security payments reflect inflation so provide a hedge to participants, and, of course, the government can print money to back up promises made.



Now is the time to think about potential discontinuities in the market, engaging strategic planning teams and boards, before they happen. Potential product design ramifications should be discussed openly, with contrarian opinions not only welcomed but sought out.

Model Office

The research report shares practical tools, leveraging regulatory requirements to visually tell a story. Chart 1 shows how a great deal of information can be learned from a limited number of deterministic scenarios. For each data point, the yield curve changes immediately from the rates on the valuation date. No floors or caps are applied, and interest rates are then held level. Some of these scenarios are required for regulatory reporting in a slightly different format, so the additional work required is minimal.

A lot of information can be processed visually from a small number of scenarios, making it an accessible tool even for small firms. This tool is applicable for any type of savings product that experiences interest rate risk. For a deferred annuity (SPDA—single premium deferred annuity), these six scenarios clearly show the optionality of the product. It confirms the convexity risk that you expected when the product was sold. The specific scenarios might vary based on risk exposures and the current environment. Other products, in this case universal life (UL) and UL with secondary guarantees (ULSG), have their own unique characteristics. Marginal analysis allows strategic combinations of exposure as part of the strategic planning process.

As can be seen visually, products have unique risk and return patterns. A picture is worth a thousand words. While some are

dominated by convexity risk, others show profitability across all scenarios or behave like an interest rate option. Do you know what the products in your portfolio look like, both by themselves and in aggregate? Accepting these different forms of risks should be done consciously after discussion of the ramifications and not justified because “everyone else is doing it.”

Applicability to Pension Plans

Managing a retirement plan for an employee group has its own challenges, but interest rate risk is similar for all types of institutional savers. Low nominal returns increase contributions necessary to keep a plan solvent, just as higher returns lead to smaller payments into the plan or expanded benefits. Risk techniques commonly used to match assets and liabilities should be utilized with DB plans, considering the life cycle of the underlying entity versus the plan (the plan will live much longer than a company).

Assumptions must be reasonable with returns set by those who have studied investment principles. Taking additional risk in order to meet unrealistic expectations is bound to have a poor ending. Valuation methodologies with conservative assumptions that are encouraged to overfund are necessary for defined benefit plans to survive in the long run. Simply performing stochastic analysis using the same model and aggressive assumptions as everyone else will lead plans to make decisions that are not in the best interest of their participants.

How to Prepare Now

Now is the time to think about potential discontinuities in the market, engaging strategic planning teams and boards, before they happen. Risk Appetite Statements and Investment Policy Statements should consider various levels of adversity, looking at scenarios covering periods of normal volatility, scenarios representing plausible disasters, and scenarios representing extremely unlikely adverse events or event combinations. Potential product design ramifications should be discussed openly, with contrarian opinions not only welcomed but sought out. Metrics like VIX (low) or margin debt (high) are examples of contrarian indicators and should be tracked.

A risk team should continually expand its knowledge base, leaving its comfort zone to stress test what may be considered tail scenarios. This does not include “asteroid” events, where the world as we know it is destroyed, but risk teams should try to overcome human cognitive bias that has trouble considering events that last occurred prior to our own lifetime.

Deterministic scenarios are better at testing adversity than stochastic scenarios. Capital requirements claim to go out beyond the 99th percentile but use assumptions from normal operating periods. It is better to look back historically to find a scenario that would challenge a firm’s survival based on current risk exposures. Examples for interest rate risk might

include stagflation from the late 1970s or the 1994 blip when rising rates exposed those with leveraged positions betting on a drop. The period surrounding a war or financial crisis can illuminate hidden risks. For those wanting to find a scenario likely to create insolvency, the late-1800s period of deflation or the Weimar Republic’s hyperinflationary period are worth evaluation. Combining one of these events with a pandemic, war, or cure for cancer may show the risk manager where risks lie.

Testing an extreme scenario does not mean you have to present it to management or regulators. A wider range of outcomes should be tested by the risk team than is presented to stakeholders. The risk manager should be incented to think more broadly than others about risk and encouraged to consider alternate viewpoints.

Conclusion

No one knows in which direction interest rates will go in the short term. Interference by governments in markets has unintended and far-reaching consequences. At some point markets must be allowed to clear without interference. Risk managers should not be asked to predict THE actual scenario, but consider a wide variety of possibilities and hedge or avoid those with negative consequences that lie outside the firm’s risk appetite.

Encourage a culture where contrarian viewpoints are welcome. In the current environment, we are trying to project the future results of a complex adaptive system with no historical precedent. This is the time to be prudent and humble. Those whose practices are resilient and flexible will have a comparative advantage and increase the likelihood that they survive and lead the next product cycle.

Risk managers who focus primarily on the scenario of slowly increasing interest rates will lose credibility over time if that scenario does not play out and it becomes obvious they presented only best-case scenarios. If internal modelers are not comfortable thinking about various potential outcomes, there are a growing number of external resources and emerging risk experts to help. Stakeholders will thank you for reaching out to them. It will be time well spent. □

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References

1. *This Time Is Different*; Carmen Reinhart and Kenneth Rogoff; 2009.
2. This article incorporates information from the research paper but also includes the author’s interpretation of the current environment.
3. *Stabilizing an Unstable Economy*; Hyman Minsky; 2008; and *Theory of Risk and Light*; David Ingram, 2010.