

Risks & Rewards



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ACTUARIES

INVESTMENT
SECTION

Mean Reversion & Chronic Low Interest Rates

By Bob Crompton

Interest rates continue at levels lower than historical norms. In early July of 2016, shortly after Brexit, yields on 10-year Treasury bonds had dropped below 1.50 percent and yields on 20-year Treasury bonds had dropped below 2.00 percent. Although interest rates have since recovered to pre-Brexit levels and higher, they remain low compared to what many people think as normal. This has caused me to think again about interest rate mean reversion.

There are currently a number of factors operating to keep interest rates at historically low levels rather than moving back to what many of us think as the historical norms—the “old normal.” In this article I recapitulate interest rate mean reversion and why mean reversion doesn’t mean we should expect higher interest rates any time soon. I also discuss a few of the developments that have given us the “new normal,” chronic low interest rates. In addition, I discuss some changes that might lead back to the old normal.

INTEREST RATE MEAN REVERSION

What Do We Mean By The Term “Mean Reversion?”

Mean reversion is usually taken to mean that market prices or interest rates will change in the opposite direction from a prior change, and that the current change may generate future changes until the price or interest rate reaches the mean of the generating function for the economic series under consideration.

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The length of time it takes for each move may vary from extremely short to extremely long.

Does Mean Reversion Really Exist For Interest Rates?

Mean reversion has been established statistically for equity prices, but for interest rates, there is only limited statistical evidence of mean reversion.

However, many fixed income traders believe interest rate mean reversion exists. The late Fischer Black, one of the most astute observers of capital markets, made the following statement:

“I believe that there is normally a considerable amount of mean reversion in the market—but it’s hard to estimate how much.”

Although Black made the statement in the context of equity prices, it is clear that he believed that mean reversion existed for interest rates as well. One only has to take a quick look at the Black-Karasinski short interest rate model to see that.

In addition, the paper “Mean Reversion Models of Financial Markets”¹ makes the point that mean reversion can exist and yet leave very little statistical evidence.

Perhaps the correct answer to the question is, “To the best of our understanding, mean reversion exists for interest rates, but we have a limited understanding of the causes and mechanisms of such mean reversion.”

What Causes Mean Reversion?

There is no strong theoretical underpinning to interest rate mean reversion. Mean reversion models have been developed to capture the historical data rather than to reflect critical aspects of financial and economic theories.

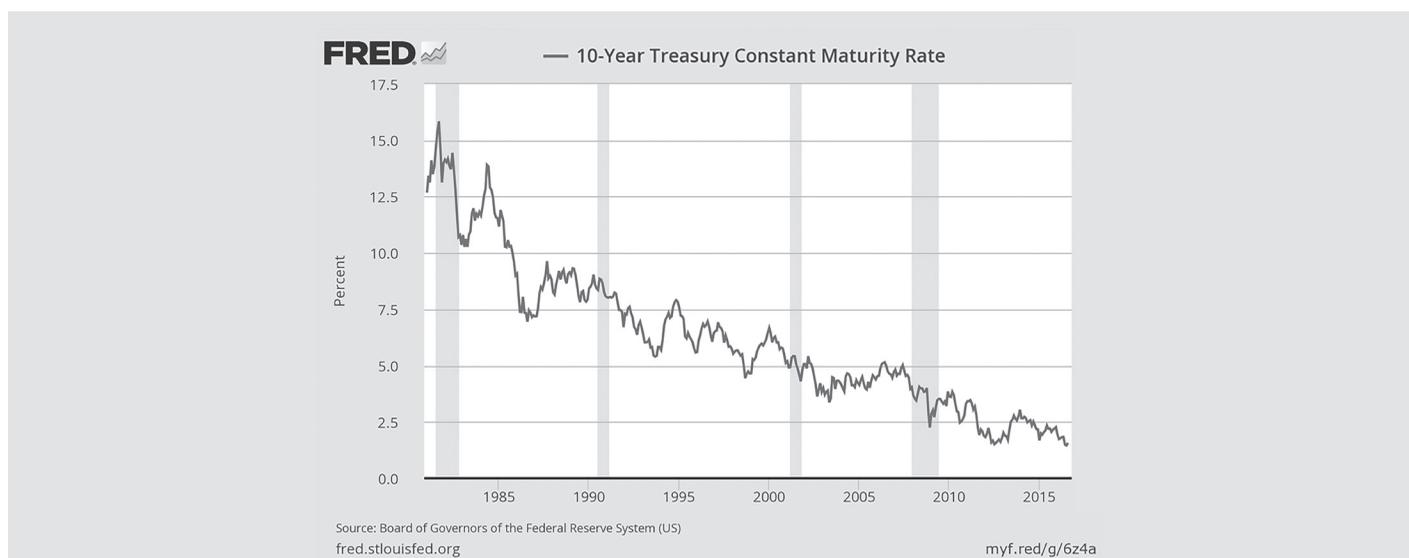
Some ideas that have been developed include:

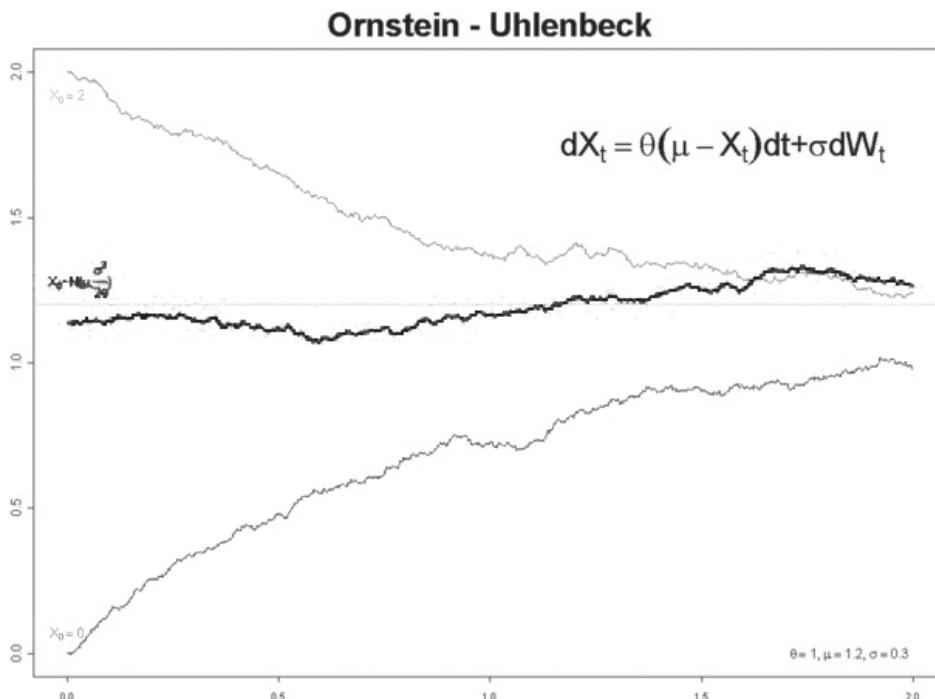
- Interest rates revert to a long-term equilibrium. This is interesting, but leaves too much to the imagination. What does the long-term equilibrium look like, and how does it differ from today’s economy? What sort of evolution should we expect to see from today’s world to the long-term equilibrium?
- Interest rates fluctuate due to psychological factors affecting market participants, causing them to over-react to emerging news. There is probably some truth to this, but by itself seems inadequate to explain long-term reversion.
- Because there is a natural range for prices or interest rates, they will move within the range and naturally tend toward the center of this range. This is the naïve view that ignores the generating function for rates.

How Do I Determine What The Mean Reversion Point Is?

There is no good answer to this question. Since neither the mean reversion point nor the speed of reversion are observable, and since there is no solid theoretical framework from which to proceed, determination can only be indirect and approximate.

A typical approach used by actuaries is to take the mean of historical rates over some arbitrary time scale. This is clearly a methodology developed to be easily calculated and easily explained. To see why this approach is, in general, not the best way to estimate the reversion point, see the chart below. It shows 10-year Treasury yield rates from January 1981 through August 2016. It is certainly possible to calculate the mean of this historical series, just as it is possible to calculate the mean of any time-ordered data series. But it is difficult to understand why—when there is such a clear and persistent downward trend—anyone would use an average as representative of the mean reversion point.





Based merely on a quick scan of the chart on page 3, we could reasonably conclude that interest rates at August 2016 are the reversion point of the historical rates. This is a likelier result than any sort of average over a trending period.

In fact, the trajectory of rates in the chart on page 3 (FRED) is reminiscent of the upper path in the chart above² showing sample paths from an Ornstein-Uhlenbeck process. Recall that Vasicek’s model of interest rates was based on the Ornstein-Uhlenbeck process.

No one would claim that you determine the mean reversion point for this by averaging across historical path values. Yet this is what the typical “actuarial” approach does. The actuarial approach will give a reasonable result when applied to a period of stable interest rates, but in general it is not a good approach.

An approach that might work better is to start with the Federal Reserve’s targeted inflation rate, then add an appropriate spread to obtain the short reversion target. Completion of the rate curve depends on the view one has of the shape of the curve at the time reversion is reached. For instance, if mean reversion is associated with some form of long-term equilibrium, you probably want an upward-sloping yield curve with a standard short-long spread, but other views are also possible.

A third approach is to simply poll the experts—fixed income traders. Find out what sort of mean reversion they are using in their pricing formulas.

DEVELOPMENTS FAVORING LOW INTEREST RATES

I believe we are unlikely to see much interest rate movement due to mean reversion. There are a number of developments that indicate we are currently in a period of low interest rates.

Supply Of Financial Capital

Since interest rates represent the cost of borrowing, both the supply and demand for financial capital are determinants of interest rates.

The table below shows GDP, wealth and global capital for 2010, the most recent year for which I could find an amount for global capital.

\$ Trillions		
Global GDP	Global Wealth	Global Capital
\$65.6	\$216.3	\$600.0

For reference, global GDP in 2014 was \$77.8 trillion and global wealth was \$262.6 trillion.

There is no official tally of global financial capital, so where did I get these amounts? Global GDP is readily available.³ Global wealth comes from the annual report put out by Credit Suisse.⁴ This statistic is included as a reasonableness check for the global capital amount since this is so surprisingly large. The amount of global capital is from the publication, *A World Awash in Money*.⁵ This was published by Bain & Company.

Clearly there is an abundance of capital in the world. There may be difficulties in deploying capital, but there is no shortage with global capital at nine times the total amount of goods and services produced in a year. How did this happen? The financial sector of the economy has been growing faster than the production and service sectors. Leveraging of financial assets currently generates a greater return than the use of non-financial assets.

The sheer amount of capital available means interest rates will likely not rise to historical norms for some time to come. The supply of capital is so great, and the search for return on capital so competitive, that economic activity will have to increase significantly before interest rates will rise due to capital.

For example, an entrepreneur who has developed a business to the point of needing capital, may find it much easier to sell an ownership interest to a hedge fund rather than leveraging the firm through borrowing. While this approach may forego future gains, this is offset by the insurance provided to the entrepreneur's wealth function through such a transaction.

And so it is throughout the economy. As capital seeks a return, it rushes in where debt capital used to tread—and sometimes in places where debt capital feared to tread. The relentless drive for capital to be productive means the crowding-out of debt capital and downward pressure on interest rates.

Demand For Capital

Demand is the other side of the coin from Supply. If there is an abundance of capital, we could restate this by saying that there is a paucity of demand for capital. Although there are no available statistics on global demand for capital, a few qualitative observations are in order.

First, production of both goods and services has become notably more efficient over the last few decades. This increased efficiency is attributable to a number of factors, including:

- Improved supply chain management,
- Process improvement and
- Automation.

Increased efficiency affects interest rates by reducing the amount of new investment in production capacity compared to what would have been required even a decade ago.

Second, there is significant unused production capacity, particularly in China. Reliable statistics are difficult to come by, but this⁶ reference gives some indication of the extent of the capacity glut. Such overcapacity limits new investments with a corresponding drag on interest rates.

Third, there seems to be a shift in new enterprises—at least for high-profile companies. These new companies often require

little or no capital investment. For example, in 2014 WhatsApp had a greater market value than Sony, but required next to nothing in terms of cost of entry.

If this is representative of new businesses, there is a significant drag on demand for investment capital.

Secular Stagnation

Some economists have recently revived the idea that developed nations have entered the age of economic senescence. This idea was first publicized back in the 1930s, and it said that the Great Depression signaled that the economy had moved into a chronic period of slow growth or contraction. The current reincarnation of this idea posits that the growth of the economy from 1940 to today was largely due to a series of fortunate one-off events that include the following:

- The kick-start the economy received from WWII,
- The baby boom's reversal of demographic contraction,
- Expansion of post-secondary education through such measures as the GI Bill and
- The expansion of work force participation rates from the large scale entry of women into the work force.

Secular stagnation states that since these one-off events will not be repeated, we should expect the economy to return to the trajectory it was on at the end of the Great Depression. This means that the next generation will not be richer than our generation, and may be poorer because the developed economies have chronically slowed. More detailed information on secular stagnation can be found in the publication, *Secular Stagnation: Facts, Causes and Cures*.⁷

In a world where our economy has slowed due to old age, we should expect interest rates to be permanently lower than they were during the more vigorous economic days. In a permanently slowed economy, there will be less expansion, less new business and less demand for borrowing.

Chronic War

Although there have been no major wars since 1945, there have been plenty of smaller conflicts since then. A Google search for “wars since 1945” yields a list far too long to include in this article.

War is tragic from many perspectives. From the perspective of this article, wars depress business activity in areas where fighting and destruction occur, and cause capital to seek safety. Both of these have the effect of lowering interest rates (certainly this is true in capital havens, and may also be true in the war zones as well).

In addition, these conflicts occur in developing nations, where capital typically has its greatest productivity, since these are nations that are farther from the economic equilibrium of more economically mature nations.

In the U.S., one of the reasons that Treasury yields are depressed is because of increased global demand for safe haven assets. The more unstable the world becomes, the more demand there is for capital havens.

As well, continued armed conflict has a depressing effect on business and a corresponding effect on demand for investment capital.

Globalization And Anti-Globalization

Globalization—the free movement of goods, people and capital between nations—has many compelling reasons from the perspective of business and commerce. It might not be hyperbole to say that continued prosperity depends on increasing globalization.

Yet there are other views and perspectives on globalization than the perspective of business. Many people feel threatened by globalization. Globalization may mean alienation, loss of influence, impoverishment and loss of control of “our way of life.” Many of these fears come from a visceral level that is not amenable to reason. We know that the other is evil.

In this Manichean world, there is a tug-of-war between the forces for globalization and the forces opposed to globalization. Whenever the forces of anti-globalization win a battle against globalization, capital owners will seek protection of their capital.



The reaction to Brexit points this out. There was an immediate flight of capital to safety, resulting in a sharp drop in U.S. Treasury yields. This sharp drop has moderated since then, but the point is that anti-globalization tends to depress interest rates by causing a flight to safety and by keeping economic growth lower than its potential level.

DEVELOPMENTS THAT WOULD FAVOR HIGHER INTEREST RATES

I do not believe that mean reversion will move interest rates very far from their current levels, but this does not mean that we are doomed to a world of low interest. There are other forces than mean reversion that change interest rates.

From a statistical view, the changes that we need are such that they will change the parameter vector of the interest rate generating function. From an economic view, these changes will disrupt the current equilibrium.

Signs And Portents

What events and developments should we expect as harbingers of increasing interest rates? I propose two main signs of impending changes in the overall level of interest rates. The first is a significant improvement in global political stability and the second is a large-scale commercial breakthrough of some existing technology.

First, any developments that generate increased political stability point to increasing interest rates. Political stability will reduce the flight to safety effects that cause reductions in interest rates in capital havens.

In addition, because business loves predictability, an improvement in political stability will tend to increase business activity.

The other main harbinger of higher interest rates is commercialization of some critical technological improvement. There has historically been a gestation period between discovery and commercialization, so it is possible that some existing technology could soon affect the economy. A number of areas seem to have the potential to come to a boil in the foreseeable future. These include:

- Genetic engineering,
- Materials science,
- Nano-scale construction and assembly and
- Robotics.

Any of these areas has the potential to create large-scale industries that would affect both sides of the economic balance sheet—production as well as consumption. It is the production side of this picture which distinguishes these potential businesses

We have to be careful not to use mean reversion as a magical incantation to set assumptions at inappropriately high levels.

from the high profile developments where there is very little effect on the production side of the economy.

Although any of these areas could commercially explode, we should keep in mind that every solution creates its own set of problems. Any of these developments may solve low interest rates, but like a bad science-fiction movie, create new issues that are just as problematic. Utopia remains just as far away as ever.

CONCLUSION

Because low interest rates may still be with us for a long time, it is important to consider carefully how we project interest. We need interest rate generators that have the ability to generate scenarios that are reminiscent of today's interest rates.

We have to be careful not to use mean reversion as a magical incantation to set assumptions at inappropriately high levels. Since there is nothing that tells us that interest rates will return to the old normal, we need to use considerable caution in setting the mean reversion point.

Finally, actuaries may need to become conversant with economic forecasts and how economic developments are likely to influence interest rates. For most of us, interest rates are often considered as divorced from economic conditions. But it is the economic conditions which give rise to mean reversion and interest rate movements. ■



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ENDNOTES

- 1 This can be accessed at http://elib.suub.uni-bremen.de/diss/docs/E-Diss549_diss02.pdf
- 2 By Thomas Steiner—File:OrnsteinUhlenbeck3.png, CC BY-SA 3.0, <https://en.wikipedia.org/w/index.php?curid=22786192>
- 3 Available without charge at <http://www.statista.com/statistics/268750/global-gross-domestic-product-gdp/>
- 4 This publication is available at <https://www.credit-suisse.com/ch/en/about-us/research/research-institute/publications.html>
- 5 This publication can be downloaded at <http://www.bain.com/publications/articles/a-world-awash-in-money.aspx>
- 6 <http://www.reuters.com/article/us-china-overcapacity-idUSKCN0V05R>
- 7 This publication can be downloaded at http://voxeu.org/sites/default/files/pVox_secular_stagnation.pdf

Double the Value – Same low Price!

By Jeff Passmore

By now I hope you have heard about the Double for Five initiative of the Investment Section. The purpose is to deliver double the value of Investment Section membership for the next five years.

Double for Five has four guiding principles:

- **Content with value.** Deliver substantive benefits, with a primary focus on professional development content. Value delivered should be commensurate with spending; i.e., nothing frivolous.
- **Increase membership.** If membership increases, this indicates we have increased the value of section membership in a meaningful way. It also increases the financial capabilities of the section to continue delivering an increased amount of valuable content.
- **Sustain it.** Deliver these benefits in an on-going way over some reasonable period to have a meaningful positive impact on the perception of the value of being a member of the section; i.e., not a flash in the pan.
- **Improve it.** Future councils will have more information than we do regarding how best to serve the membership in future years. This continuous improvement is an intentional part of the plan. This plan simply sets a high bar for future councils to deliver increased value to our membership and lays out a process for clearing this higher bar.

The SOA has about 30,000 members and about 10 percent participates in the Investment Section—consider our potential for growth!

PLANS FOR 2017—FIVE KEY INITIATIVES:

- **Six webcasts**—one every other month or so. We have balance between pension investment, insurance investment and general actuarial investment topics.
- **Best Article contest**—similar to our biennial Redington contest but focused on articles written for our semi-annual newsletter Risks and Rewards.
- **Best Essay contest**—we will start with a call for essays and publish what we receive in a format similar to the Investment Fallacies eBook published in 2014. We will also determine the best among these and award the winner.
- **Significant keynote speaker**—*Freakonomics* writer Steven Levitt will present the keynote address at the Investment Symposium. Levitt has great podcasts covering interesting topics—check him out in advance of hearing him speak. We will also have other great breakouts. I hope you have made plans to join us in Chicago, March 9–10.

MEMBERSHIP DRIVE

The SOA has about 30,000 members and about 10 percent participates in the Investment Section—consider our potential for growth! It's hard for me to imagine an actuarial job that has nothing to do with investments. Maybe it is just the optimist in me, but I believe that many of the remaining 27,000 could benefit from being members of our section.

My point is this—we have a great value proposition in the Investment Section and it gets better the more members we have. Spread the word to your colleagues. They can add the section to their SOA membership at any time; so even if they have already renewed and they left off the Investment Section, they can change that and get on board. It's as simple as visiting the Join a Section page on the SOA website.

Have them indicate that it was you who referred them and you will be in the running for our Membership Drive—first prize is \$500, second is \$300 and third is \$200. The official rules are on the website at: <http://www.soa.org/Professional-Interests/Investment/invest-detail.aspx>

Regards,

Jeff Passmore ■



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Correspondent's Report from the SOA 2016 Annual Meeting and Exhibit

By Warren Manners, Kelly Featherstone and Evan Inglis

“A little bit of this town goes a very long way.” Hunter S. Thompson was not referring to an actuarial convention when he said these words, but the 2016 SOA Annual Meeting at the Cosmopolitan in Las Vegas did manage to pack a lot of interesting material into just three and a half days. There were more than 180 different sessions, numerous section breakfasts and lunches, bootcamps, a mobile scavenger hunt, and plenty of opportunities to network. Every year R&R provides our readers with a synopsis of some of the more investment focused sessions for those of you who might not have been able to attend. This year's Correspondent's Report summarizes two sessions: Introduction to Alternative Investments, and Hand-to-Hand Risk Management: Lessons from the Casino Floor. [WM]

INTRODUCTION TO ALTERNATIVE INVESTMENTS (SESSION 17)

Panel Discussion: Seth Koppes (expert in insurance-owned insurance contracts), John Simone (Insurance Solutions at Voya Investment), Peter Sun (Consulting Actuary at Milliman) and Aimee Wight (Investor Relations at Monroe Capital)

This panel discussion presented current thinking about investments in “alternatives” at insurance companies. Alternative investments were defined broadly as anything other than publicly traded fixed income, so that, for example, private placement fixed income was included in the discussion. The key factor that made this a timely topic is that many insurance companies are broadening their investment horizons in a search for additional return/yield and are willing to take the risk that goes along with that.

Survey and anecdotal information indicates that large companies and those with ample surplus were more likely to invest in alternatives. Smaller, less well-capitalized companies may have little or no alternative investment because they lack the risk budget and the expert resources to manage them, even though



consultants are available to help. Alternatives are typically allocated to surplus rather than to back liability for a particular product, though private credit would be an exception. The challenge of modeling alternative investments, which have less empirical data to support assumptions and more idiosyncratic risk, was mentioned.

Private credit was described as typically providing 125 additional spread over publicly traded corporate bonds. Private infrastructure investments are also becoming more common.

The most surprising part of the session was a discussion of the use of insurance-company-owned life insurance contracts as an approach that might provide good returns with low capital requirements. Insurance contracts on an insurance company's balance sheet have low minimum capital requirements associated with them, which create potential for a good return/capital requirement ratio. Both life insurance and annuity contracts purchased with insurance company employees as the beneficiary were described as having potential in this area. [EI]

HAND-TO-HAND RISK MANAGEMENT: LESSONS FROM THE CASINO FLOOR (INVESTMENT SECTION BREAKFAST)

Investing is an inherently risky activity and as investors we look to earn an acceptable rate of return while managing investment risks. Casino operations also require active management to optimize their risk and return trade-offs. Dr. David Schwartz is the director of the Centre for Gaming Research at the University

of Nevada Las Vegas. He is fascinated with the history and current developments in gambling. He has extensively interviewed front line casino staff to understand how they manage risk and influence profitability for casinos. In his presentation, Hand-to-Hand Risk Management: Lessons from the Casino Floor, Dr. Schwartz shared his findings on how these day-to-day activities can help casinos make, or lose, big money.

Casinos are designed to make money over the long run by offering negative expectation games, but shorter term results can vary, particularly when high rollers are playing. Losses can also occur as a result of theft, cheating, bad decision-making by casino managers and slow dealing. Casino managers have the day-to-day discretion to make decisions on table limits, game rules, issuance of credit (to high rollers), authority to comp freebies to players, and settlement of disputes. Casinos also face a host of other existing and emerging risks from customer and employee satisfaction to lawsuit and regulatory risks (including AML). Dr. Schwartz's research has indicated that adherence to established policies can be one of the strongest ways to mitigate the many risks that casinos face. Mitigating both card counting and shot taking (players bending rules or claiming misunderstanding) require experience and discretion to optimize outcomes. In this way, casino managers have to have a firm handle on "the math" of the games, as well as when to let things slide or take actions to protect casino profitability.

After listening to Dr. Schwartz' presentation about the activities casinos take to manage risk and minimize losses for themselves, I think I will invest my money in the markets where I will have better odds of winning ... over the long run. [KF] ■



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Re-Think the Risk: Use and Misuse of Statistics

By Sylvestre Frezal

Are insurers risk management professionals? Should we use statistics to manage risk? We tend to make conflation when we speak about risk. Let's clarify its meaning to stop misusing powerful tools.

When an insurer and a policyholder sign a contract, they see the same phenomenon, but they do not face the same situation. Thanks to the law of large numbers, the insurer knows that 1,000 of its 10,000 policyholders will develop cancer, while the policyholder does not know if he will have a cancer. In other words, the policyholder is facing risk whereas the insurer is not: the business of insurance is not to manage risk, but to manage heterogeneity—the heterogeneity of outcomes, the heterogeneity of its clientele where some customers will have a cancer and some will not.

A MATTER OF PERSPECTIVE

A given phenomenon can have different natures. For example, consider a glacier. For the geologist who analyzes the flow of the ice tongue in a valley, the correct description is that of a viscous fluid. For the mountaineer climbing a crevasse, the correct description is that of a solid. The glacier, oil or granite? It depends on the observer, and mathematical modeling must differ.

And it's not because the geologist has distance compared to the climber that the last would gain by adopting the point of view of the first: the geologist does not have a better understanding of the material in the absolute: it would thus be irrelevant for the climber to listen to the geologist and exchange his ice ax for a wetsuit.

Similarly, an insurance contract is a given phenomenon but of a different nature as it is seen by an insurer or a policyholder (globally deterministic vs. individually random): representations of each must be adapted. Thus, from the standpoint of the policyholder (individual viewpoint), using statistics (global viewpoint) to understand his situation may not be relevant.



To manage heterogeneity, statistics proved their efficiency. As a matter of fact, insurers and actuaries have used statistics successfully for two centuries to price products efficiently, routinely making money. Shall we therefore conclude that statistics are efficient to manage risks? In other words, do statistics make sense from the policyholder point of view, to make a decision? Or, similarly, do statistics make sense for an insurer when he thinks not about his everyday recurring profit but about his potential risks? To these questions, our answer is no.

However, many stakeholders seem to consider that the answer is yes.

For example, a former quantitative analyst who worked in a large bank in London in 2008 once told me: “After 2008, we had to account for 2 billion in losses. That is to say, we had to find models that would have enabled us to avoid those losses. We tested several complex models—stochastic volatility ... and it didn't work. We realized that we'd get creamed every time.” These demands are symptomatic of a pervasive conflation in the financial industry, whether banking or insurance, whether investment strategies or regulation: a conflation between the business tools monitoring the profitability (quants' statistical models to make money every day), and risk management tools (to avoid losses during the worst crisis of the century); conflation between their properties, and, therefore, between the expectations, one may have vis-à-vis them.

To avoid such conflation, we shall characterize the distinction between the two natures of situations: randomness vs. heterogeneity. It will allow us to establish the scope of relevant statistical tools (statistical distribution functions and related variables) and then to examine the consequences of using these tools outside their scope of relevance and propose an alternative method to face risk.

THE TWO DISTINCT SITUATIONS

A decision maker is placed in a **random situation** if he faces a phenomenon which he does not know the realization in advance, and which will only happen a few times, typically only once. Conversely, he is placed in a **heterogeneous situation** if he faces a phenomenon that happens often enough so that even if he does not know in advance every realization, he knows in advance the overall outcome: thanks to the law of large numbers, it can neglect the difference to anticipation and consider the whole phenomenon as deterministic.

Typically, when signing an insurance contract, the insurer is in a heterogeneous situation while the policyholder is in a random situation. When choosing a strategic asset allocation, the insurer is in a random situation: if the performance is bad and it goes bankrupt or loses many customers, he cannot play again. Our question is: in random situations, are statistics a relevant tool to rely on for decision-making?

When In A Random Situation, Statistics Are Meaningless

Let's consider the simplest statistics: expectation. Should you explain its meaning to somebody, could you provide any intuitive description without using a formula such as "assume that we play several times, then that's what we would get on average"? I guess you cannot. When explaining concretely what mathematical expectation is, you have to impose hypothesis of repetition of the phenomenon, and afterwards to refer to an average.

But when you are in a random situation, the hypothesis of repetition on which you rely cannot be verified. Your reasoning is based on hypothesis which is not verified: this is a fallacy. If ifs and buts were candy and nuts, wouldn't it be a merry Christmas? From a psychological point of view, one can appreciate the soft cocoon of a virtual world, but from a logical point of view, it is nonsense. When in a random situation, expectation is meaningless. Then, relying on expectation or on any other statistics leads to a flawed reasoning.

When In A Random Situation, The Use Of Statistics Distort The Understanding Of The Situation

Why do we tend to appreciate this psychological cocoon? Because it gives us the comfortable illusion that we detain information on the future, on what will happen. This has consequences.

In 2008 for example, Alan Greenspan explained in the FT that he was in a state of shocked disbelief. However, he still hoped risk models would allow to identify periods of euphoria from speculative fever breaks. As if risk management tools could predict uncertainty. As most of us do spontaneously, he seemed to forget that when taking a decision under uncertainty, what is at stake is that we do not know what the future will be. Why such a misunderstanding?

Because a quantified world is a world that feels deterministic. This is natural: statistics can be interpreted only through a virtual positioning into a heterogeneous situation; that is a situation where randomness has been pooled and has disappeared into the law of large numbers. Using statistics therefore places the decision maker into a mental scheme where the world is deterministic. This leads to disillusionment, e.g., when people regret that "risk models did not anticipate that," forgetting that the essence of risk is the impossibility of forecasting.

When In Random Situations, No Accountability Can Be Enforced Through Statistics

When in random situations, we do not know what will happen. An expert tells us that "there is a 30 percent chance that there is a recession"? Big deal! He could say 1 percent or 90 percent, in one case as in the other, neither the recession nor its absence was excluded: whatever the outcome, the assessment was not wrong. One expert tells us that "stock market expected return is 4 percent"? So what? Whatever ultimate yield is observed, it will not be inconsistent with his initial statement. Again, it is never wrong.

If, whatever they say, these experts cannot be proved wrong, then believing them is not an act of science, but an act of faith. From an epistemological point of view, these quantities are not scientific. From an operational point of view, they do not allow for any accountability.

MEASURING (OR NOT) THE MODEL ERROR

When facing a heterogeneous situation, you can compare, afterwards, the distribution function anticipated *ex ante* to the distribution function observed *ex post*: you can measure the model error. A dispersion model can be challenged. It is science, and it commits an accountability.

When facing a random situation, you cannot do such comparison. There is a full fungibility between the risk model and the related model error. As you cannot distinguish them, you cannot challenge any risk model. Risk model is not science. And there is no accountability.

When In Random Situation, Statistics Do Not Provide Mathematical Objectivity

One could, however, argue that taking a step back, it would be possible to shift from a **random situation** to a **heterogeneous situation**, and as a consequence to challenge a statistical assessment. For example, if the insurer provides me a probability of cancer of 10 percent, I could then compare this probability to the proportion of these who were given this estimate and actually got a cancer. But why would it be objective to compare me to these other people? Perhaps 10 percent of us had a 100 percent probability and the others 90 percent and 0 percent probability. My personal probability has been necessarily defined by reference to a given population. Which one?

Those of my age? Of my gender? Of my corpulence? Of my sports habits? Of my cell phone utilization frequency? Of my post code? Of my medical history? Of my DNA analysis? Of my profession? Etc. Should I answer yes to all these questions, I would be unique and there would be no reference to determine a probability. It is therefore necessary to answer no to some of them. And the choice of these questions is a qualitative judgement which cannot claim for mathematical objectivity. In other words, quantitative statistics is necessarily the outcome of previous qualitative judgements. And in statistics as anywhere, subjectivity in, subjectivity out!

What To Do Then?

In random situations, statistics are just like whisky. It helps facing a difficult decision where we have no good choice. It gives us courage, but it does not improve the quality of the decision we make. Quite the opposite, since it misleads us, generating illusions of objectivity and preventing us from apprehending the risky nature of the situation.

THE MYTH OF “BETTER THAN NOTHING”

When hearing criticism against reassuring quantitative tools, a question comes spontaneously, “What’s the alternative?” Is this question legitimate for operational decision?

Consider a man lost in the desert. He is thirsty. He has a beer available. He is about to drink it when a physician tells him that alcohol will only increase his dehydration. Would it be sound to ask the doctor, “What’s the alternative?” if the doctor has no alternative to beer? Should the walker drink it because it is “better than nothing,” rather than continuing to move forward while thirsty, as far as his legs will carry him, in search of water he may not find?

Similarly, being able to rest on statistics is reassuring and nice, but if they are “not wrong” and degrade the judgment, it may be better to do without, even without palliative. However, we have an alternative to offer!



As a consequence, the first step is to stop using statistics when dealing with random situations.

According to Machiavel, the Romans went so far because they accepted their fear. So, should the decision-maker do the same; face uncertainty rather than trying to hide it behind a ribbon of math, assuming the subjectivity of his vision (a subjectivity which a leader has legitimacy for) rather than tacitly delegating it to the experts who calibrate the tools (and who have no legitimacy for enforcing their subjectivity)?

How To Put Such An Ambition Into A Decision Method?

Prof. of Sociology Andreu Solé gives us a clue when explaining that people make their decision relying on their oblivious vision of the future: we tend to split the different potential futures (the situations we may be confronted with, the decisions we could make) into three categories. The Possibles, which could happen, the Impossible, which cannot, and the Ineluctables, which shall happen. For example, most global CEOs would consider a presence in China as an Ineluctable, a presence in Africa as a Possible, and a presence in Afghanistan as an Impossible.

OUR DECISIONS ARE DETERMINED BY OUR PERSONAL, UNCONSCIOUS REPRESENTATIONS OF THE FUTURE

We obviously split the future in three categories: the Possibles, the Impossible and the Ineluctables. Our decisions result from this personal vision.

For example, at dawn on Dec. 7, 1941, the radar operators in Pearl Harbor observing points on their screens saw a dysfunction of this recent technology as a Possible, and an attack without declaration of war as an Impossible. Such a representation of the future led them to spoil two hours checking their radar rather than alerting and drifting the ships out of the harbor.

Obviously, the Japanese pilots, at the same moment, did not have the same representation of the future.

To face uncertainty and favor awareness in decision-making under risk, we should exploit this natural way of thinking, turning it into an explicit process of analysis:

- First, enrich our spectrum of Possibles by identifying the largest set of future scenarios. This is the time for challenging and rebutting our oblivious Impossible, for benefitting from the experience of experts to enlarge our vision of the futures.
- Second, sort out what we will consider as Impossible. By Impossible, I mean here that we agree to neglect its consequences, to take the risk of such an outcome. This selection

THE CORE GOVERNANCE POINT

The representation of the potential futures cannot be delegated to the experts, as good as they may be. The decision is embedded in the analysis, and hence the subjectivity of the analysis is the prerogative of the entitled decision-maker.

is not the task of an expert: this is the time for acting as an aware decision-maker assuming its subjective risk appetite.

- At this stage of the analysis, the decision maker has clarified his vision and, de facto, the decision is already made, as it will be a straightforward, mechanical outcome of the decision maker's accepted vision. From now on, it is only a technical matter: the experts will determine which action provides the best pay off in the central scenario, under the constraint of providing acceptable (as defined by the decision-maker) output in the remaining Possible scenarios.

The Price To Pay

Being objective while facing the unknown is a chimera, but abandoning such an ambition and such a psychological cocoon is a hard price to pay. However, awareness, explicitness and responsibility, as tough as they are, are a necessary ground for better decision-making. ■



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Taking Stock: Has Political Correctness Entered the Financial World?

By Nino Boezio

In the U.S. political arena in 2016, political correctness had been experiencing a serious challenge from the far right. The deep-seated resentment over political correctness among segments of the American populace among other issues, helped propel Donald Trump to the presidency.

Political correctness has many definitions that vary, but it often seeks to eliminate forms of discrimination beyond what we used to consider standard in prior periods of time. It can exclude language that could be self-deprecating, potentially offensive or disadvantageous, especially to certain groups of people.

We have seen it permeate little league sports teams as scores are not kept and winners are not decided, so that those on the losing side do not have egos or feelings hurt. In major league sports, some teams that had their names for decades have faced pressure to change them, or face severe criticism and possibly see their events boycotted (even though it can be argued, the names of such teams were not chosen to be insulting or deprecating, but were selected because of a noble trait in that particular characterization). In the course of time, we could see teams with names that include references to Badgers, Cougars, Eagles, Hawks, Lions, Pythons, etc., also face pressure to change, since the names may be considered offensive to animals.

On the geopolitical stage under the virtues of political correctness, a country that is misbehaving might not be openly rebuked for such behavior anymore, but addressed in a rather gentle way, the belief being that by being nice and polite, a malefactor may then decide to be nice back.

I sometimes wonder whether this push towards political correctness has also permeated the investment industry. In the opinion of the author, I think it has to some degree, or at least there has been a push towards softer language. Let us consider some of the following (I am also trying to be a bit outrageously humorous for effect):

- **Central Banks**—it seems we are less willing to say anything that is detrimental to the behavior and actions of central banks. They are omniscient and are the saviors of the world. Their venture into uncharted territory through their policies is a detail that some want to point out as worrisome, but highlighting this fact can be seen as politically incorrect. We should not say anything that could be offensive to central bankers.
- **Asset Discrimination**—it seems that any statement that favors a particular investment or security over another, is much more tempered today. Let us not disparage any particular asset class. Let us make less relative assessments. We can be wrong.
- **Market Forecasting**—we probably do not need that activity anymore, since the world has become so much more stable. We have learned the lessons from the past. Everything is just going to move along in a straight line so let us not have anyone spoil it by saying this is not so.
- **Market Timing**—that has become an almost hateful, dirty word. Anyone engaging or suggesting such an action can be condemned and labeled as ignorant and silly. Any strong opinion on future market performance is now often muted, since it can also create fear.
- **Litigation**—let us not say anything negative about any particular financial or investment action, since this could generate adverse legal action. After all, do we truly know if a particular security or investment is truly bad or not? It is all subjective as the saying goes.
- **Asset Inflation**—I find that most are less willing to admit asset bubbles are being created. We can find or invent some metric (someplace) that can show that certain investments are not that expensive, after all. There are no absolutes.
- **Price Inflation**—there is no such thing. Even though it seems that what we buy at the supermarket is getting more expensive or the packaging is becoming smaller, we are looking at the wrong stuff. Let us not get too excited. Referring to any type of inflation can be prejudiced and biased.
- **Competition**—the desire for different groups to outdo each other is totally unnecessary. Let us have competition eliminated and adopt a more conciliatory tone. No one is going to charge us too much if they know their product is the only one on the market, since everyone is good-natured. They will keep their prices low for the greater good. The idea that people are greedy when they are the only providers in town, is purely hypothetical.

- **Currency Hedging**—hedging currency at 50 percent is the perfect politically correct response. We can be half-right or half-wrong and everyone will be happy. No one needs to be unreasonably biased in one direction or another. Having a glass half full or half empty is the perfect example of varying perceptions.
- **Active vs. Passive Investing**—let us avoid the active-passive investment debate altogether by buying investments such as smart beta or factor-based ETFs (Exchange-Traded Funds). No personal decisions need to be made (i.e., it is all rules-based eliminating the impact of emotion and opinion), while we still have the opportunity to exceed the benchmark and everyone is satisfied. These investment solutions are a perfect politically correct response. The angst of choosing between an active or passive investment strategy is now gone.

Perhaps my references above may be a stretch as far as political correctness is concerned, but I have noticed a softer, gentler tone within the financial industry in the past number of years. There is a fear of being dogmatic, a lack of being overly confident in any particular view or idea (relative to the past), and possibly an open-mindedness that is gone farther than necessary. I used to like hearing strong and bold statements about investment opportunities and scenarios, and these seem to be more lacking these days. Or maybe it is the result of a financial environment which is far more uncertain and unpredictable, and hence there is a desire to stay unlocked from a firm position.

GETTING BACK TO REALITY

Various statements made during the 2016 political campaign were labelled as negative (and outside the realm of being politically correct), but they did represent reality to many. For example, Mr. Trump said the following:

"I just say this: We are a country that doesn't win anymore. We don't win anymore. When was the last time we won? We don't win on trade. We don't win on the military. We don't beat ISIS. We don't do anything. We're not good. We're just not the same place. We are going to win, so much.

"We're going to win at the military; we're going to win on trade; we're going to get rid of Obamacare and come

up with great, great powerful, wonderful health care. I'll tell you what. We're going to win again. We're going to win at every single level, and we're not going to be laughed at by the rest of the world."

As mentioned before, political correctness can exclude language that is self-deprecating. The above quote is a very good example of that. The Clinton campaign liked to portray that the U.S.'s best days were still ahead and that all of the Trump language just brought the country down. We do not want anyone or any particular group to feel bad.

There is a reality that we see on display every day in the financial world. The world is competitive and we cannot assume certain details do not matter. Perhaps because the U.S. has always managed to "dodge the bullet" whether it be in financial crises, wars, social upheavals, etc., some do not want to focus on the negative. But ignoring the negative will result in no solutions being put forward—we cannot ignore bad events under the assumption that everything will work out in the end. Action does have to be taken since the world is not actually a nice place. Consider the following:

- **We Cannot All Be Winners**—being a loser can benefit a person more than they realize. They want to try harder the next time. They want to create better products and solutions. There is a big desire to win in all of us. It may not be politically correct to think like this, but this can help everyone who does not give up. Learning to deal with negative emotions effectively helps one to rise to the challenge the next time and try harder.
- **Investments Do Fail**—we cannot assume every investment can be a good choice, even if every one of them is supported by the best of intentions. We know that pretending that all investments are created equal is not true. Evaluations need to be made and then adjustments can follow to better serve the needs of investors.
- **The \$20 Trillion U.S. Federal Debt**—something is wrong when a country such as the U.S. continues to mount up huge levels of federal debt, and this is also true for its other programs such as Social Security and Medicare/Medicaid where the deficits continue to skyrocket.
- **There Are Dishonest People**—we may have to call out those who are not acting in the best interests of the public. Being passive is not the best solution for our society. Political correctness should not be used as an excuse to not identify those who are acting inappropriately and can hurt investor confidence.
- **Supporting Weakness Creates More Weakness**—protecting vulnerable industries is not often the best solution unless

... we cannot ignore bad events under the assumption that everything will work out in the end.

they have also been treated unfairly. We need to properly assess which is which. Sometimes foreign goods are not better choices, but they may have received advantages created by currency exchange differences, support by their governments or generous subsidies. On the other hand, certain industries may need to shrink or fail if they no longer make sense. A soft tone towards potential areas of weakness does not produce positive reform.

- **Decisions and the Herd Instinct**—political correctness can blur decision making and create a herd instinct as some investors become less discriminating in their choices. Sometimes choices need to be made and these decisions are tied to a particular reality, not based on the belief that all factors in a decision must be weighted equally. A refusal to identify certain factors in investment decision making will often result in more parties making similar conclusions, as the range of factors considered is reduced.
- **Evolution Does Create Progress**—Regardless of what one thinks about the theory of evolution, the survival of the fittest principle does lead to greater progress and innovation. When we try to make all levels of play equal which can happen through regulation and protectionism, it can stifle the upward mobility of an industry or the speed of innovation.
- **Nations Do Not Play Fair**—when a competing country knows that another country is unwilling to confront emerging issues due to various sensitivities, it can pose some serious disadvantages. We see this today with the debate over immigration, where some countries are willing to be open to all types of immigration while others are now being quite restrictive. The flow of new individuals into or out of a country can change the degree to which local social services are being strained and impact the use of local resources. This is also something that needs to be addressed, but being politically correct often results in the conversation being avoided altogether.
- **We Cannot Be a Welfare State**—sometimes political correctness aims to protect those who are disadvantaged, but sometimes the net result becomes an endless cycle of dependency. Often the greater good is achieved when everyone tries to be productive. A prod is sometimes required to get people motivated again, rather than to avoid the problem altogether by ignoring it, thinking that the alternative is too sensitive and can hurt people's feelings. Assessing the problems more realistically can divert limited resources to those who need it the most, but political correctness can again prevent the issues from being assessed objectively.

- **Denial of Geopolitical or Other Risks**—being overly concerned that open criticism of a nation state can be too provocative, is not a solution to avoiding various global risks. Sometimes peace can be achieved by pointing out improper activity or behavior and working through it. We are a global community that can be impacted by the actions of various countries and this can impact investment performance.
- **Those Who Do Not Embrace Political Correctness Make Money**—political correctness can help others make money. When restrictions are placed on economic or financial activity in the name of political correctness, then those who do not have such impediments can take advantage of the situation. Until the world as a whole moves along together with a similar mindset, advantages and disadvantages remain. An example of this may be responsible investing, where we may not want to invest in a certain company because it exploits the behavior of various groups, but until the spotlight is focused on the matter, some will benefit inappropriately. We need to raise the playing field across international boundaries, but this takes time.

SUMMARY

Political correctness in 2016 has sometimes been attacked as being on the verge of ridiculous, no longer being properly reflective of the world we live in. It may have gone too far. One remark that had often been made about Mr. Trump (that made him popular), is that “he tells it like it is.” The attempt in our society to make all things equal and to avoid pointing out the things that are failing in areas such as the global economy, in the spirit or name of political correctness, is not useful or productive. Only by focusing sometimes on the negative can we also better the society and the economy, even if we feel like losers for a time.

In the area of investments, we may also be finding a hyper-sensitivity as to how investment performance and activity is described and portrayed. Maybe the above comments on how political correctness has also affected the investment world have some validity, or maybe the author is becoming hypersensitive to the subject himself and is seeing something that is not truly there, and needs to be politically corrected. ■



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Strategic Asset Allocation in Asia: Optimizing Across Portfolios

By Michael Chan, Fred Ngan, Thomas Tang and Jack Law

Note: This is an excerpt of a forthcoming whitepaper on setting a Strategic Asset Allocation framework. Reprinted with permission of Coherent Capital Advisors Limited.

Many regional insurers in Asia have been evaluating and re-positioning their asset portfolios, generating a lot of interest and activities in Strategic Asset Allocation (SAA) and the tools to help evaluate investment strategies. Implementing an SAA is one of the highest leverage activities that is easy to put off for an insurance company. We see a few key drivers behind these recent changes:

- Persistent low interest rate environment, and a lack of levers available to insurance companies to maintain their profitability. This issue is particularly acute for those markets where intense competition has left many insurers with legacy portfolios carrying high guaranteed interest rates.
- In contrast to the U.S. where statutory required capital regulations are more mature, regulations across Asia are still maturing and there is an increased focus on asset-liability management. This is part of an overall attitudinal shift towards encouraging better risk management, to be balanced against previous national priorities of increasing insurance

penetration rates while requiring insurers to be prudent when setting reserves and maintaining solvency margin.

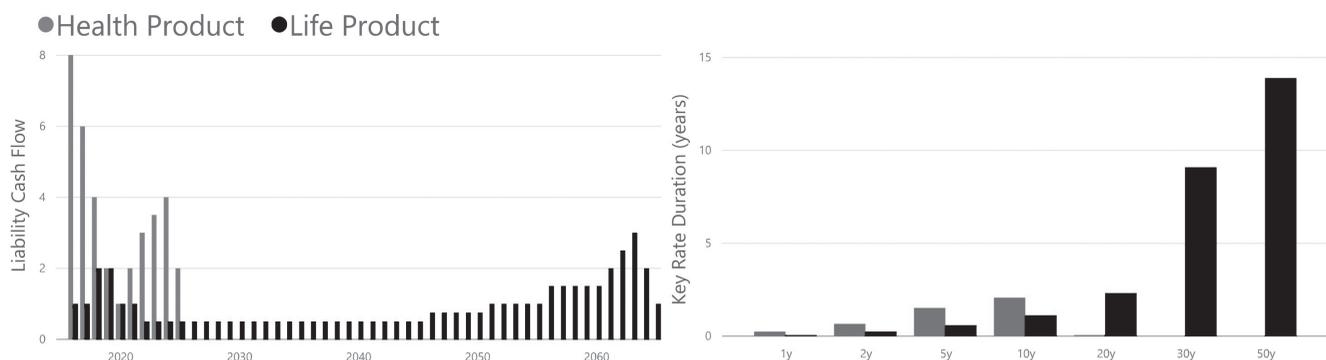
- Some regulators have loosened restrictions on insurers to invest overseas, sometimes in response to the low yields available to insurers domestically.
- Non-traditional asset classes are gaining attention due to both demand (yield) and supply factors (e.g., tightening of banking regulations opens opportunities for insurers to finance infrastructure projects).

A common challenge insurers face amidst all this change is processing all the implications of these changes across multiple portfolios. In this article, we use a simple case study to introduce a data-driven process to evaluate alternatives presented across multiple portfolios. Such a process has the advantage of increasing the transparency and confidence in the robustness of the recommendations, as trade-offs that can be readily quantified and explained.

UNDERSTANDING YOUR LIABILITY AND CAPITAL PROFILE

Insurance companies typically have multiple product lines. The cash flow and risk profiles of different products often vary significantly. For our simple case study, we have a simplified insurance company with only two product portfolios—a long-term life product and a short-term health product. Figure 1 illustrates the liability cash flow patterns and duration profiles of these two portfolios. Although the two products are set up to have similar valuations, the two product lines have quite different size and timing of cash flows, interest rate sensitivities, etc. The better the SAA team understands the product portfolios, the more likely they can arrive at an effective solution for asset-liability management. From our experience, some insurers in developing markets struggle to have a good sense of their cash flow positions due to the absence of a robust asset-liability model.

Figure 1: Best estimate liability cash flow and duration profile



DEFINING THE SAA OBJECTIVES AND CONSTRAINTS

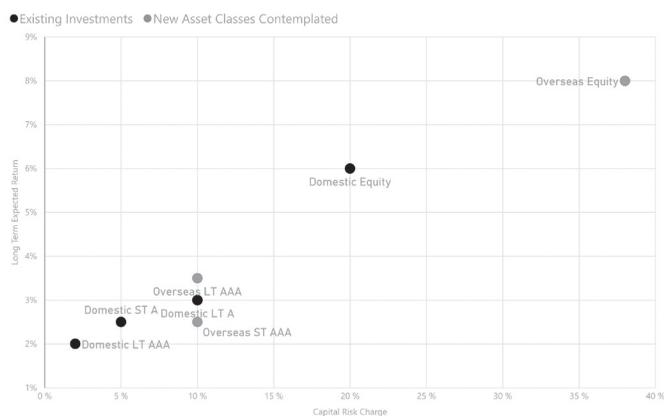
Insurance companies have multiple stakeholders—risk, capital, investments and actuarial groups to name a few—driving different objectives and constraints on the asset allocation decision, compounded across local and regional offices for Asian insurers. It is often up to the SAA team to engage multiple parties and balance their interests, particularly when asset allocation conflicts arise.

Due to the different regulations across Asia (with each market at different levels of maturities), conflicts can arise for regional insurers where a good asset allocation in one market can create issues for the parent operating under different regulations (e.g., different risk-reward tradeoffs under local statutory compared to those under Solvency II for European insurers). This necessitates an iterative process to setting objectives/constraints and testing results. We believe that a proper SAA model can greatly expedite the feedback cycle to make the process more efficient—and less frustrating—for the SAA team.

CONSTRUCTING THE ASSET UNIVERSE AND DERIVING ASSUMPTIONS

Developing future returns and correlations assumptions can be a challenge, especially for non-traditional asset classes in which an insurer has no prior experience. External asset managers and investment consultants may be able to provide perspectives on the appropriate return target, implementation strategies and realistic expense levels. Figure 2 demonstrates a Markowitz-style risk/return trade-off that could be adopted by an insurance company contemplating overseas and alternative investments, and is a good starting point for screening whether certain asset classes make sense at a high-level and for visually catching unrealistic assumptions prior to running any models.

Figure 2: Asset return assumptions and capital risk charge



EVALUATING RISK-RETURN TRADE-OFFS WITH AN SAA MODEL

Traditionally, financial and risk reporting models are

re-purposed to perform SAA analysis by running brute-force trials across different asset allocations. While this approach appears reasonable for resource-constrained actuarial teams, attempting to determine a set of optimal allocations this way is a manual, tedious and time consuming process. It also deters companies from undertaking deeper, more insightful studies as it would require performing many different model runs using a resource- and time-intensive process. Consequently, many insurers miss the opportunity to leverage from a comprehensive SAA study.

One promising trend we have observed in Asia is a gradual shift towards building “light” SAA models that extend existing actuarial models to deliver faster analysis of different asset allocations decisions. There are significant benefits to having a model which abstracts SAA-insensitive elements (for instance, mortality risk) from calculations to improve speed across analytical iterations without sacrificing model accuracy.

With the aid of speedy, light SAA models, we could go beyond traditional analyses that were typically only feasible on a small number of asset allocations, and enter the realm of large scale analyses. We strongly believe that a quantitative change in the data and results available can lead to a qualitative change in our understanding of the issue and the solutions.

We tested the two portfolios in our case study using a light SAA model over hundreds of thousands of different asset allocations. The results are presented in Figure 3 (page 22) as “clouds” of points on the risk-return space at two levels of granularity—fund level and total company level—where risk is measured in terms of the amount of statutory capital required.

In Figure 3 (page 22), we highlight two competing portfolios with similar risk levels (at the total company level). Each cloud of points represents the risk/return results for one of the funds. Some quick observations to explain the two charts:

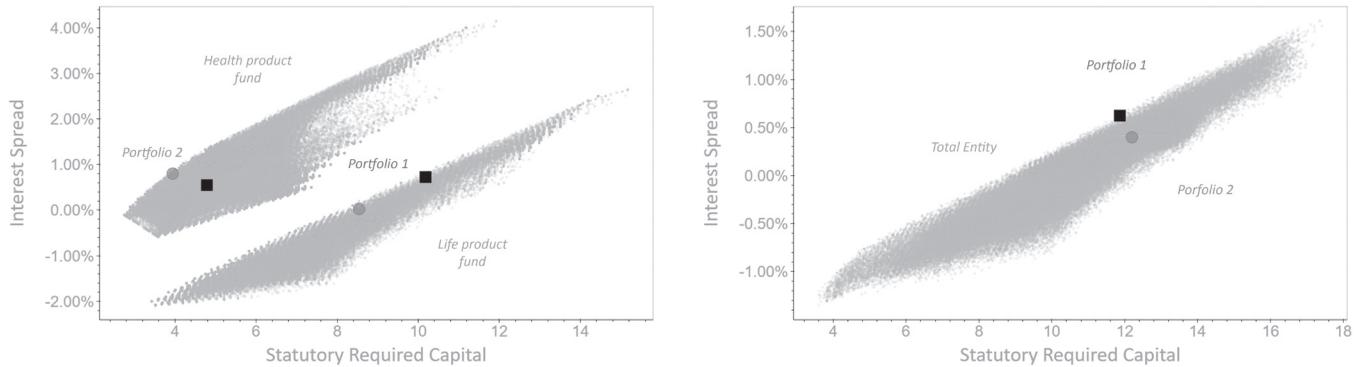
At the sub-fund level, Portfolio 2 seems to be better optimized:

- Portfolio 2 lies on, or is close to, the efficient frontier in both the health and life product funds.
- In contrast, Portfolio 1 seems to be reasonably optimized in the life product fund, but is visibly sub-optimal in the health product fund as it lies far away from the efficient frontier.

But at the total company level, Portfolio 1 outperforms Portfolio 2:

- Interestingly, although Portfolio 2 was “optimal” in each of the sub-funds, the aggregate result at the entity level is visibly sub-optimal.

Figure 3: Tracking portfolios that are efficient at different aggregation levels

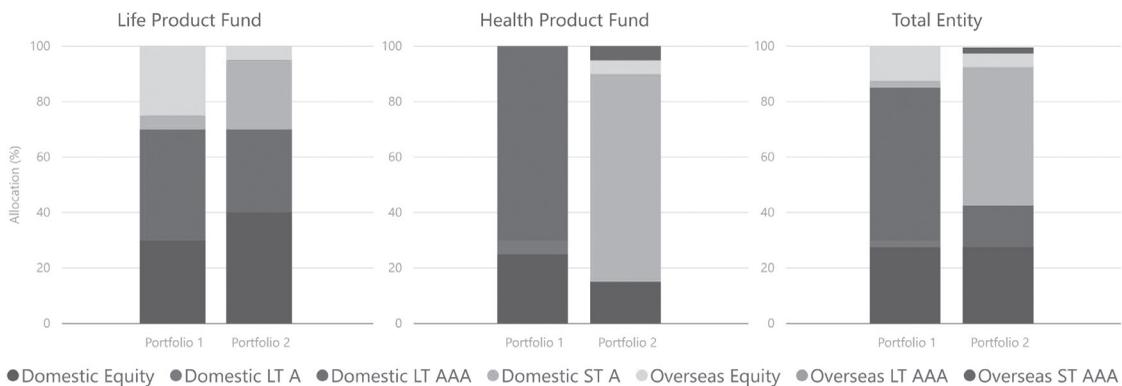


- In contrast, while Portfolio 1 was not optimized at the sub-fund level, its performance at the entity level is optimized.

This illustrates how selecting “optimal” portfolios at the fund level does not guarantee the best results at the total company level. In effect, the company’s capital could be more efficiently used by opting for a seemingly “suboptimal” allocation in Portfolio 2.

In this case, the apparent trade-off between the two portfolios stems from the choice of fixed income durations. Portfolio 1 invests heavily in high-grade long-term bonds to help with the overall long duration requirement driven from the life product fund.

Figure 4: Asset allocation of portfolios



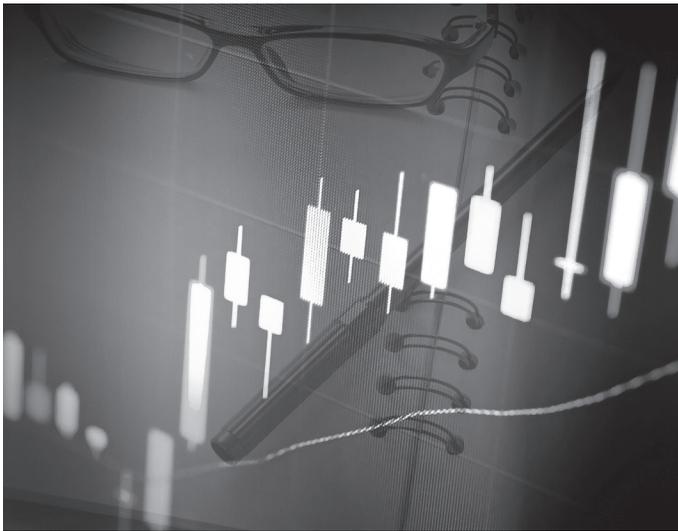


Figure 4 (previous page) shows the actual asset allocations of Portfolios 1 and 2, for the life fund, health fund and the resulting entity level allocations respectively.

In effect, the apparent “success” of Portfolio 1 at the entity level is due to its seemingly suboptimal allocation within the health product fund that had the effect of subsidizing the life fund to bolster overall performance. And this is “encouraged” because the long-term life products are more capital intensive than the shorter term health products. Even in this simple example, we generated a scenario where there is a trade-off between fund optimality and company optimality. While it may seem reasonable to prioritize company-level capital efficiency, management may question whether it’s sensible or indeed equitable to allow cross subsidization. In addition, there are many implications to consider: product pricing, and management KPIs and performance compensation to name a few.

PRESENTING SAA AND ALM, AND EMBEDDING THE DECISIONS INTO OPERATIONS

An SAA analysis is only as useful as its improvement to the business, and we need to “measure what matters,” is how Peter F. Drucker puts it in his book *What Gets Measured Gets Improved.*”

Changing the SAA (for instance, adding a new asset class or changing the asset mix) can have wide-ranging ramifications to business operations from product pricing through capital management. Embedding this into the decision-making process and operations of the various functional groups within a company requires a sound governance structure, together with

comprehensive monitoring, to ensure the key technical and commercial considerations are covered.

CONCLUSION

In this article, we described a process to develop a strategic asset allocation (SAA). We showed how a combination of small-scale, intuitive runs can be combined with larger-scale, computationally-intensive runs to provide more insights.

The key enabler of these new methodologies is a lighter, accurate SAA model that can be built on top of existing systems, and the advent of cheap computational power that allows our focus to shift from trying to run optimizations and instead focus on generating the full set of results from which the analyst can explore using modern analytical techniques.

Finally, through the analysis on the risk-return trade-off at both fund- and company-level optimality, we also showed how the results of these new types of analyses can be visualized to better communicate the insights to senior management and demonstrate the value of investing into the SAA models and analytics. ■



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Risk/Return, a Chimera?

By Sylvestre Frezal

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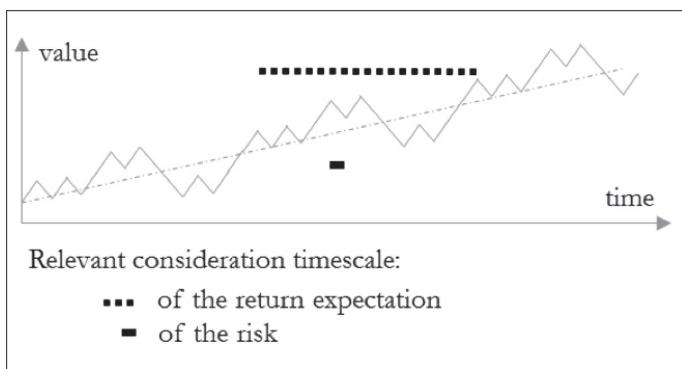
In the short term, you don't get the expected return—risk may be relevant, but expectation is not. In the long term, the risks offset and disappear—expectation is relevant, but risk is not. A decision is judged on a given temporal scale—either the short term or the long term. Then, when using risk/return, you rely on an inconsistent concept. Let's clarify this point and its impacts.

A quantified optimization of risk/return is often considered as an investment best practice, both for asset managers, investment departments of insurers, or even considering the robo advisors proposed to non-professionals. Is this relevant? Does a quantified risk/return improve decision making? Does it provide objectivity? I do not think so.

THE QUANTITATIVE RISK/RETURN, AN OPERATIONALLY FALLACIOUS CONCEPT

Expectation is what remains once the risks have mutualized, statistically offsetting each other—when considering a risk/expected return couple, the time horizon on which expectation can be observed is at least one order of magnitude longer than the one on which risk can be observed.

Figure 1



The design flaw of the risk/expected return is that such a couple relies on a time horizon inconsistency. For a given decision-maker, “risk” has a meaning at a timescale when “return” does not, and vice-versa. There is no timescale, at which risk and expectation both have an operational meaning.

In other words, from an operational viewpoint, the quantified risk/return does not exist: either expectation is a good estimate of the result that we will get, meaning that the risk is negligible, or the risk is not negligible, meaning that expectation is significantly far from the result that we will get. If we want expectation to be concrete and meaningful, then risk has to be insignificant; and reciprocally, if the risk is significant, then expectation is totally virtual and has no concrete meaning. For example, if I know that at the end of the year, my stocks will either drop by 20 percent or raise by 30 percent and if I invest only till the end of the year, then I do not care about the fact that, in the long run, the stock return would be on average of either 4 percent or 7 percent. Concretely, expected return does not provide us an estimation on the return which we will actually get, even if you invest for 10 years. This can be observed in Table 1, an example of a gold return.

Table 1

Gold Return	Global Return	Annual Return
1960–1970	2%	0%
1970–1980	1607%	33%
1980–1990	-38%	-5%
1990–2000	-27%	-3%
2000–2010	339%	16%



A QUANTIFIED RISK/RETURN DISTORTS OUR UNDERSTANDING OF THE SITUATION

Although expectation is not an estimate of the return which will actually be observed, it is generally perceived as such by the risk/return users—as a kind of “best estimate.” As a consequence, the decision-maker representation of the world is biased.

The decision maker was not able to forecast the future? Now he has two known, given figures; the two parameters being determined, the world seems to be deterministic. The quantification made the feeling of randomness disappear. Paradoxically, people then tend to consider that (i) they should systematically get the expectation and that (ii) a risk which did not occur should not have been considered as a risk. (See sidebar.)

A TOOL WHICH CANNOT OFFER THE EXPECTED QUANTITATIVE OBJECTIVITY

The claimed ambition, the *raison d'être*, of the quantitative tools relying on risk/return is to objectivize the decision. In practice however, when the risk is significant, it is not possible to objectively calibrate a statistical indicator. Let's take again the example of the expectation, and consider the DJ total return. Which time period shall we use? Shall we consider that we are in a post-financial crisis world? (9.9 percent) Shall we consider that our world is the world of the internet era? (2.3 percent) Shall we consider that nowadays economics is the one of the post oil-shock period? (9 percent) And if we had asked ourselves these questions in 2014 rather than 2016, the results would spread on a wider range: 12.8 percent, 1.5 percent and 6.1 percent.

Table 2

DJ total return since ...	Seen at Year End 2015	Seen at Year End 2013
the financial crisis (01/2009)	9.9%	12.8%
we entered the internet era (01/2000)	2.3%	1.5%
we live in the post oil-shocks economy (01/1982)	9.0%	6.1%

(source : dqydj.com)

Choosing between these different options requires an expert judgement; that is, by definition, a non-quantitatively objectivizable choice. Unfortunately, as it can be seen in Table 2, the dispersion between these expert judgements is wider than the dispersion between asset classes (just compare it to the US 10Y return over the period—depending on the time period chosen, it will be higher or lower). As a consequence, any final output relying on such input cannot be considered as quantitatively objective. The very purpose of the risk/return relying tools, i.e., quantitative objectivity, cannot be reached.

THE CORE GOVERNANCE POINT THE DIFFUSED AND PARADOXICAL FEELING OF A DETERMINISTIC WORLD

i. When not getting expectation is perceived as abnormal

During an investment committee meeting, a CFO stated that “*we have a higher level of risk than the market ...*” and was straightforwardly interrupted by a critical business development executive “*in this case, we should have a higher rate of return. I do not feel that's the case ...*”

ii. and not suffering from the risk realization too:

A leading industry lobbyist argued: “*Can you imagine that following the currently selected criteria, those who sold their Apple stock three years ago to buy Greek debt would be exemplary according to Solvency II regulation?*”

Of course, this feeling of a deterministic world leads to cruel disillusion, e.g., to the frequent reproach made to risk models which “*did not anticipate the last crisis.*”

A TOOL WHICH DEGRADES GOVERNANCE AND DESTROYS ACCOUNTABILITY

A governance issue then arises as subjectivity tends to become the prerogative of experts rather than the preserve of the decision-makers. Senior managers are the ones who are entitled to activate their subjectivity. But using such tools leads to swap from an assumed subjectivity, located at the official decision-making level, towards a hidden subjectivity, actually concealed into the analysis level.

Furthermore, it will always be impossible to distinguish expert post between the modelled variability and a potential model error—nobody will ever be able to criticize the quality of the calibration; so experts are not accountable. And risk/return never excludes an adverse realization—the decision-maker choosing any allocation on the efficient frontier can always claim having chosen an optimal allocation without being accountable for any catastrophe, should it happen. In a nutshell, neither experts nor decision-makers are accountable—these tools offer nothing but an excellent formalization of “*bad luck.*”

SO WHAT? PROPOSING AN INTEGRATED (ANALYSIS-DECISION) TOOL UNDER THE DECISION-MAKER CONTROL

Risk/return use is harmful in several ways: first, because it generates a feeling of determinism and then damages the correct apprehension of the situation; second because it distorts the decision-making level through an oblivious transfer which prevents accountabilities identification. This calls for new asset allocation methodologies.

A scenario-based approach (see Figure 2, below) attempts to resolve these issues and leads to abandon the tender illusion of a quantitative objectivity provided by experts.

Figure 2

THE THREE STEPS OF A FORMAL SCENARIOS BASED OPTIMIZATION

- 1. Open the field of possible scenarios:** identify the future scenarios that could be considered. *(strong support of the experts to the decision makers)*
- 2. Take responsibility on the strategic vision and risk taking:** exclude from the previous list of scenarios these “in which we do not believe” or these which risk is accepted to be run (e.g., a default of U.S. government bonds?) *(decision makers)*
- 3. Optimize under constraint:** maximize the return in the central scenario under the constraint of acceptance of the output in all the other not-excluded-scenarios. *(experts)*

Since several scenarios are considered, the fact that the decision-maker does not know how markets will evolve materializes, and hence it reintroduces the feeling of randomness (step 1). The vision may be incomplete, a scenario can be wrongly neglected, but the perception of the very nature of the phenomenon is no more biased. Furthermore, the fact that the decision-makers chose the scenario to be considered—and what scenarios to disregard—reintroduces stakeholder accountability and improves governance through an explicit and properly located subjectivity (step 2).

Such a methodological evolution modifies the positioning of the technical teams (quantitative ALM) regarding the executive management.

As a matter of fact, technical teams remain of the utmost importance to focus the decision-maker’s attention toward possible scenarios which they would not have considered; to draw a typology of those scenarios so that they do not become too numerous to be cognitively handled by the decision-maker (step 1); to estimate impacts; and finally to optimize under constraint (step 3).

The technical teams will be much more exposed. The technical layer that allowed to dissolve their responsibility via the absence of falsifiability disappears. Furthermore, being the vehicles of the widening of the field of possible scenarios and the promoters of a random vision of the future, the technical teams become a source of anxiety for the executive management, where previously, through their reality perception distorting tools, they were a tranquility center. However, they will benefit from an improved visibility and a more strategic positioning through deeper exchanges which will no longer be limited to an efficient frontier presentation. ■



Sylvestre Frezal is the founder and co-director of the chair PARI (ENSAE ParisTech & Sciences Po), focusing on the apprehension of risks and dangers. He can be reached at sylvestre.frezal@datastorm.fr.

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2016 Investment Section Asset Allocation Contest Winners Announced!

By Jim Kosinski

After five months of up-and-down markets (mostly up, fortunately), the Asset Allocation Contest winners were announced at the Investment Section breakfast at the SOA 2016 Annual Meeting & Exhibit in Las Vegas. The prize-winners were Nick Fiechter for the Create Alpha contest, Troy Dempsey for the Accumulation contest, and Ken Westover for the Drawdown contest.

This year, the markets were cooperative. For last year's contest nine of the 10 asset classes went down (the sole exception being short-duration bonds), which led to a decision to increase the number of asset classes to 20 this year. This year, all 20 asset classes had positive returns over the five-month contest, although there were some wild rides. Twenty of the 100 monthly returns were gains of 3 percent or better, six were drops of 3 percent or worse. The benchmark 60/40 portfolio (60 percent ACWI/40 percent BND) produced a return of 4.2 percent and an annualized volatility of 9 percent.



Jeff Passmore speaking at Investment Section breakfast.

The “Create Alpha” contest tested people’s ability to construct a portfolio that outperformed a “traditional” 60/40 benchmark portfolio ...

One interesting curiosity of the market performance for this year’s contest is that a “buy the losers” strategy would have been dominant. A strategy that held the benchmark portfolio for May, and rebalanced at each month-end to be fully invested in the asset class that performed worst in the previous month, would have returned 14.2 percent after rebalancing costs! This compares to a best-asset-class buy-and-hold return of 11.3 percent (Russell 2000), and is significantly better than the best return achieved by an Alpha contest entry (9.8 percent). Very few contest entries made use of the rebalancing option; maybe more will next year.

The “Create Alpha” contest tested people’s ability to construct a portfolio that outperformed a “traditional” 60/40 benchmark portfolio after adjusting for risk. Roughly half the contest entries (24 of 46) generated positive alpha. The redesigned contest objective of promoting risk-taking while limiting volatility worked as intended, as all but one of the “positive alpha” portfolios had volatility less than 13 percent, and all but three had returns in excess of the 4.2 percent benchmark return. Nick Fiechter won the prize with a return of 8.0 percent and a 9.6 percent volatility, for an alpha of 3.5 percent.

The “Accumulation” contest tested participant’s ability to maximize a portfolio’s accumulated value, with a starting value of 100 and four “contributions” of 10 coming in at each month-end. There was also a monthly “portfolio review” process that cut underperforming portfolios. The “portfolio review” was designed to encourage portfolios to track the benchmark more closely, and it did punish some portfolios: the May portfolio review saw the exit of five entries that were fully allocated to gold, and July saw the cut of two entries fully allocated to commodities. However, many concentrated portfolios survived the portfolio reviews, including the winner. Troy Dempsey won (via tiebreaker) with a final value of 152.64.

The “Drawdown” contest tested how long participants could maintain a portfolio through time, starting with 100 and withdrawing one per trading day. The contest period encompassed 107 trading days, so not running out of money before Sept. 30 was a difficult task. Ken Westover almost managed it, finally exhausting his portfolio with a withdrawal of 0.87 on Sept. 29.



Nick Fiechter receiving his winnings
(l-r) Jeff Passmore, Nick Fiechter, Jim Kosinski.

Full results are available on the Investment Section webpage on the SOA website.

Thank you again for participating in the 2016 contest! We hope you enjoyed this year's changes; our hope was that they would make the contests more realistic and interesting and we think they mostly succeeded. What do you think? We always appreciate feedback or suggestions on how we can improve the contest. Feel free to reach out to Leslie Smith (lsmith@soa.org) with your feedback and she will pass it along to the Section Council.

We hope you will participate in the 2017 contest! ■



Jim Kosinski, FSA, CFA, MAAA, Ph.D., a member of the Investment Section Council, is VP Actuarial at Guggenheim Insurance in Indianapolis. He can be contacted at Jim.Kosinski@guggenheiminsurance.com.

INVESTMENT SECTION—REDINGTON PRIZE NOMINATIONS

The Investment Section Council is now seeking nominations for the 2017 Redington Prize recognizing the best paper written by an actuary on an investment-related topic during the last couple of years. The prize is sponsored by the Investment Section and is named after F. M. Redington, the eminent British Actuary who coined the term “immunization” in a 1952 paper that was published in the *Journal of the Institute of Actuaries*.

The 2015 Redington Prize winning paper was, “Optimal Portfolios Under Worst Case Scenarios,” by Carole Bernard, Jit Seng Chen, FSA, and Steven Vanduffel, and its authors collectively won a \$10,000 cash award.

The criteria for selection and basic participation details are as follows:

Publication Years: The paper must have been published during the calendar years 2015 or 2016.

Author(s): The author of the paper must be a member in good standing of the Society of Actuaries (SOA), Casualty Actuarial Society, American Academy of Actuaries, Conference of Consulting Actuaries, American Society of Pension Professionals and Actuaries, Canadian Institute of Actuaries, or Institute and Faculty of Actuaries, must be a legal resident of the U.S., Canada or the United Kingdom, and must be at least 18 years of age. Additional eligibility requirements (including requirements relating to papers with multiple authors) are set out in the Official Rules, available through the hyperlink below.

Content: The topic of the paper must be judged to be original, practical and be primarily of investment nature and of substantial value to SOA members and to other investment professionals.

Source and language: The paper must be published in a peer-reviewed journal which can include but is not limited to *North American Actuarial Journal*, *The Journal of Portfolio Management*, *Financial Analysts Journal*, *Journal of Finance*, and *Journal of Financial and Quantitative Analysis*. The paper must also be drafted in English.

Judging: The selection criteria include intellectual rigor, practical significance, investment content, educational value, and originality. The Council reserves the right to choose not to award a prize.

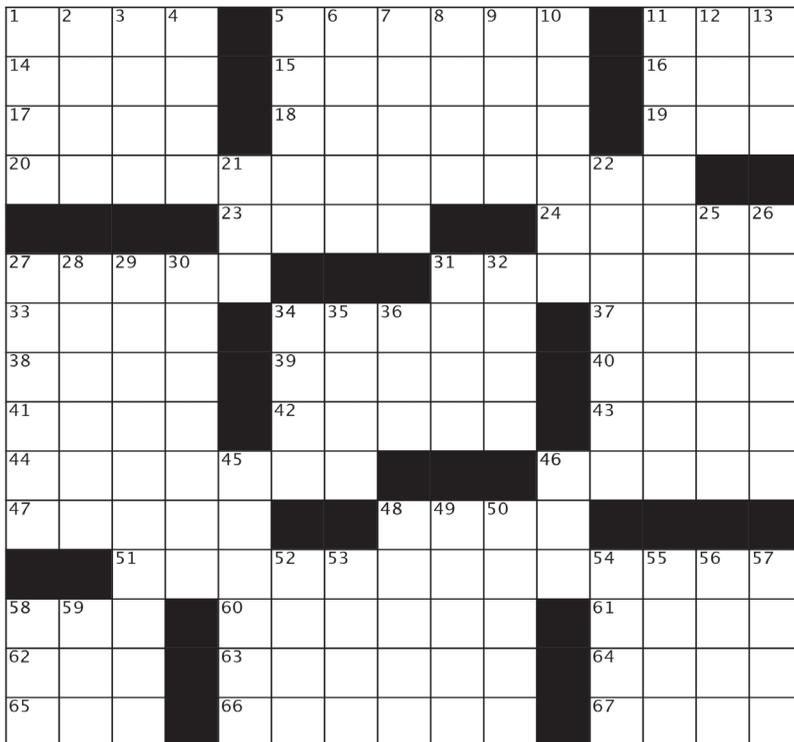
Nomination: Papers must be submitted via e-mail to Investment Section at sections@soa.org or mailed to the SOA, attention: Investment Section, 475 N. Martingale Rd., Suite 600, Schaumburg, Illinois, 60175 USA.

Prize: One Grand Prize of USD \$10,000 will be awarded to the winning paper's eligible author(s).

Additional details: The submission period opens at 12:01 a.m. CST on Feb. 28, 2017 and closes at 11:59 p.m. CDT on June 2, 2017. Void where prohibited. No purchase necessary. Other restrictions may apply. See Official Rules for eligibility, odds of winning, how to enter, and other details: www.soa.org/redingtonrules2017

Crossword Puzzle: 48 Ours

By Warren Manners



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The solution will be provided in the next issue of *Risks & Rewards* along with the names of those who were able to successfully complete it. Submissions should be made to warren_manners@swissre.com by May 31, 2017. For submissions received before the posted deadline and 100 percent correct, a winner will be selected at random and awarded a \$25 Amazon gift card. Note, previous winners will not be eligible to win the very next issue's prize.

ACROSS

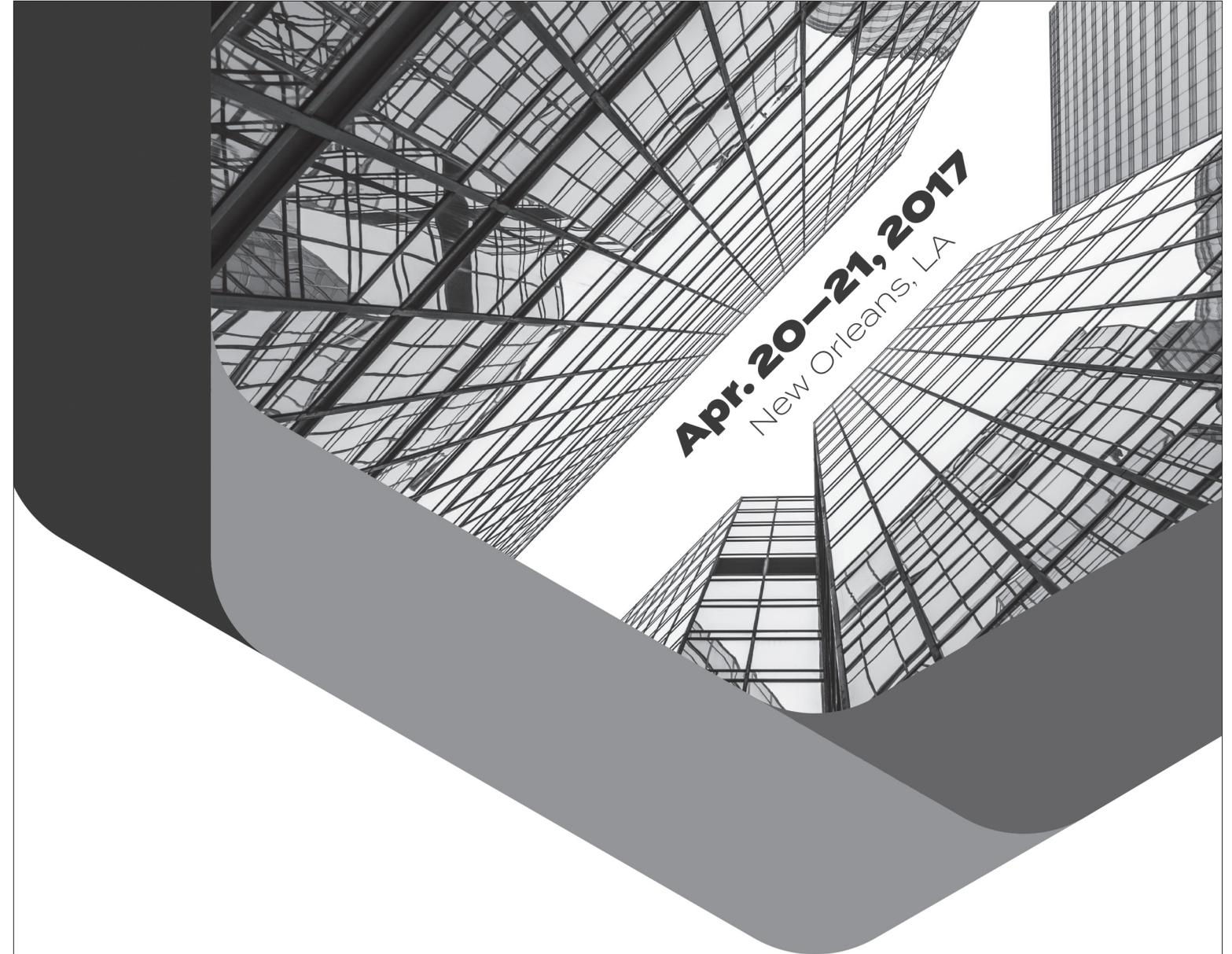
- 1 Bridge action
- 5 ###
- 11 Cricket club
- 14 Suit
- 15 Bear fruit
- 16 It's fit to be tied
- 17 Greek goddess
- 18 Mountain sheep
- 19 Alternative to "smoking"
- 20 Product?
- 23 Expressions of apathy
- 24 Russian mush
- 27 Deer sirs
- 31 One walking down the aisle?
- 33 Big shot
- 34 Square meal?
- 37 Floozy
- 38 Amazon native
- 39 Sit down to
- 40 River in Brazil
- 41 Stage piece
- 42 Tire type
- 43 Depraved
- 44 Vacuum
- 46 Repairs
- 47 Fruits or escorts
- 48 Altar end
- 51 Target?
- 58 Family guy
- 60 Mint family herb
- 61 Willingly, to Will
- 62 0
- 63 Collar
- 64 It's out on a limb
- 65 What birds and bees do?
- 66 Poker plays
- 67 Afflictions

DOWN

- 1 Turf
- 2 Car bar
- 3 Wise man
- 4 Racket
- 5 Chip of wood
- 6 Draconian
- 7 Young or MacGyver
- 8 Din
- 9 Botswana buck
- 10 Drunk as a skunk
- 11 Arthritis for Mr. Ed
- 12 Blood letters
- 13 Canterbury can
- 21 E-mail alternatives
- 22 Vehicle?
- 25 Usher in
- 26 Shaw and others
- 27 Cool joint
- 28 Kidney shutdown
- 29 By all accounts
- 30 Regulation?
- 31 Marquee name
- 32 Course goal
- 34 Pub order
- 35 Nap. I and III
- 36 Three R's org.
- 45 Scab
- 46 ____si, the best ever
- 48 Onagers
- 49 Plain talk
- 50 Scottish clans
- 52 Jaguarundi
- 53 Antidepressant, for short
- 54 Norse goddess
- 55 Cambodian cash
- 56 Osso buco base
- 57 Two out of fifty?
- 58 Never completed: abbr.
- 59 Be off

AMPULES ARC ARS
 QUITALY ACE MOA
 UGANDAN RAN INN
 ASS EGRESTONIA
 AUIEO EPONA
 MORONS JEANS
 EYING NORWAYOUT
 NET LAA OER PRO
 USAYADIOS IMAGO
 OMILL TABLET
 ADOBO EDENS
 DEPORTUGAL ARB
 AGE OAS GLOTTAL
 MAP UTC GOTTOGO
 SSE SAT ANOSMIC

Solution to the August Crossword Puzzle
 No completed submissions



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