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## The Upside of the Downside of Modern Portfolio Theory

*By Bob Rice*



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In January 2016, 10-year Treasury bonds looked rock-solid according to modern portfolio theory (MPT). They then lost 5 percent in 11 months. Later in 2016, investors in TLT, an exchange-traded fund (ETF) of longer-term U.S. government bonds, lost 17 percent in just three months. And after November 8, global bonds declined by a trillion dollars in three days.

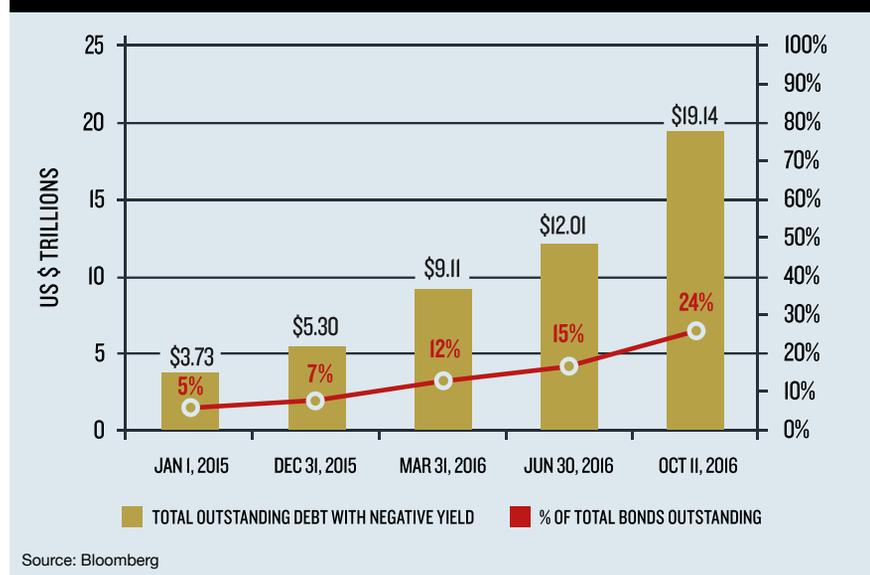
MPT didn't see these losses coming for a simple reason: It recognizes neither duration nor geopolitical risks. These are just a couple of the many factors that drive today's markets and are invisible to MPT's math. And that's why basing today's portfolios on models from the modern investing world of 1952 is like going to a museum's map room to plan your next trip.

Consider the three key assumptions on which MPT is based: Risk is quantifiable by reference to past volatility; asset correlations are static; and outcomes follow normal distribution patterns. Some, like Nicholas Taleb, have long objected to these constraints, and indeed 2007 proved his point that fat tails and converging correlations were much more of a risk than MPT disciples had assumed.

But the "Trump tantrum" exposed an even more-basic objection: MPT ignores patently obvious real-world phenomena and risks that have everything to do with investment outcomes. It operates with blinders on, unable to account for truly critical changes in economies and markets that have evolved in recent decades.

That's a problem—and for savvy advisors, an opportunity. As MPT-based robo-advisors and other passive investing solutions threaten much of the human-advice

Figure 1: Negative Yield Bonds October 2016



industry, advisors who can recognize and respond to MPT's shortcomings can demonstrate enormous value to clients. This article suggests a framework for doing just that.

## The Dominance of Policy Makers

MPT aims to construct portfolios that optimize return for a given level of risk and live on the efficient frontier. But that begs the question: "What is risk?" Harry Markowitz, of course, defined it as realized volatility.<sup>1</sup> We can, he assumed, correctly measure how much risk securities carry by reference to their historical behavior.

This thinking failed spectacularly in the great financial crisis. The math of MPT evaluated that crisis as a one-in-10,000-year event. So either we really were amazingly unlucky—because that's the entire span of human civilization—or the formula mis-defines risk.

Looking at risk this way is especially dubious in markets dominated by policymakers, as they now are: Human decision-makers' motives and actions are driven by factors unattached to historical price patterns—and can have far greater potential price impact than any fundamentals.

There's no need to rehash here how the global central banks have injected trillions of dollars of manufactured liquidity into markets over the past few years, but a few graphics are still striking. For example, figure 1 shows just how distorted the bond market had become as of the month before the 2016 U.S. election.

And of course universally uber-low rates drove investors into longer-term instruments to find yield (figure 2).

Meanwhile, the resulting enormous duration risk remained unmeasured by MPT and only

**Figure 2: Duration of Barclays Global Aggregate Index**



Source: Bloomberg

**Figure 3: Real Assets vs. Financial Assets**



Source: Merrill Lynch

became obvious to average investors through the painful losses mentioned above. The episode provides an ideal example of how easily MPT can provide a false sense of certainty about prospective portfolio behavior.

The central bank market distortions haven't been limited to bonds. "I don't think a single trader can tell you what the appropriate price of an asset he buys is, if you take out all this central bank intervention," UBS Chairman Axel Weber said in October 2016.<sup>2</sup> Or consider former Dallas Fed President Dick Fisher's take: "What the Fed did, and I was part of it, was front-loaded an enormous market rally in order to create a wealth effect ... and an uncomfortable digestive period is likely."<sup>3</sup> Central banks had driven equity prices to extended levels by nearly every traditional metric.

So the stock market action after the election powerfully reinforces how much policies—and policy expectations—now drive securities prices. Almost nothing actually changed in November, but the markets launched to even loftier valuations: World equity markets ballooned by \$635 billion in the month, according to Bloomberg.<sup>4</sup> A Trump tantrum in bonds was Trumphoria for stocks.

Why? Because the way in which we formulate expectations about the future has changed. It's no longer about business cycles, market-driven interest rates, or even classic supply and demand. When it comes to predicting prices, MPT's tools (realized volatility, mean variance, historical-valuation metrics, and the like) simply can't compete with predictions of central bank and governmental policies.

And as electorates around the world reject long-standing economic and political norms and agitate for profound change, one has to conclude that black swan events are ever more likely than backward-looking averages indicate.

That's why relying on MPT today is a lot like the old joke about a drunk looking all night long for his keys under one lamppost. When asked why, he says, "It's the only place I can see." Similarly, we can stare at past price behaviors all we want, but they're unlikely to shed light on how asset prices will behave in the future.

### Non-Stable Correlations

Another basic tenet of MPT is that correlations between asset classes remain stable over time. The 2008 financial crisis exposed this as a theoretical convenience when correlations of most asset classes went to 1. But no great crisis is required to see asset correlation relationships do change.

One current more-relevant example is the swinging ratio between real and financial assets prices. As Merrill Lynch's Michael Hartnett recently pointed out, the price ratio of financial to real assets is near an all-time low (see figure 3).<sup>5</sup> Obviously, it may well swing back to the mean if the new pro-inflationary government policies that markets expect kick in.

But even among traditional asset classes, increasing correlations have been chipping away at the classic rationale of the 60/40 mix for some time (see figure 4). Of course the trend modulated in the fourth quarter of 2016, but the variability of the correlation is exactly the point.

But how could stocks and bonds both have been at historically high valuations? It's easy to understand why bonds did well as growth sputtered, but why did stocks? That puzzle dominated many an investment committee discussion. But Occam's razor says that the best answer to a complex problem is often the simplest, and that's probably true here.

The simplest answer is discounted cash flow. As the risk-free rate falls, the present

value of a fixed future return stream rises. Looked at this way, the market was perfectly rational in ascribing ever-higher current prices to a non-growing future return stream for stocks. As proof, consider that utility stocks, the traditional fixed income surrogate, were the best-performing sector for most of 2016 and carried the highest price-to-earnings ratio.

So the primary reason investors were paying more for equities (i.e., a falling discount rate) was different than normal (i.e., rising economic prospects). This spells trouble for MPT beyond the generalization that if assets move together there's not much benefit in diversification—because even if stocks start to see better earnings, their value may not rise much from here. After all, if equity earnings expectations rise, risk-free and discount rate rates likely will rise, too, and the present value of modestly increased earnings streams may stay flat or decline.

That scenario would be (undesirable) poetic justice. If we got rising stock prices while earnings fell, we might expect falling stock prices while earnings rise. Just as stocks and bonds have risen together, they can fall together, too. That is definitely not what MPT models expect.

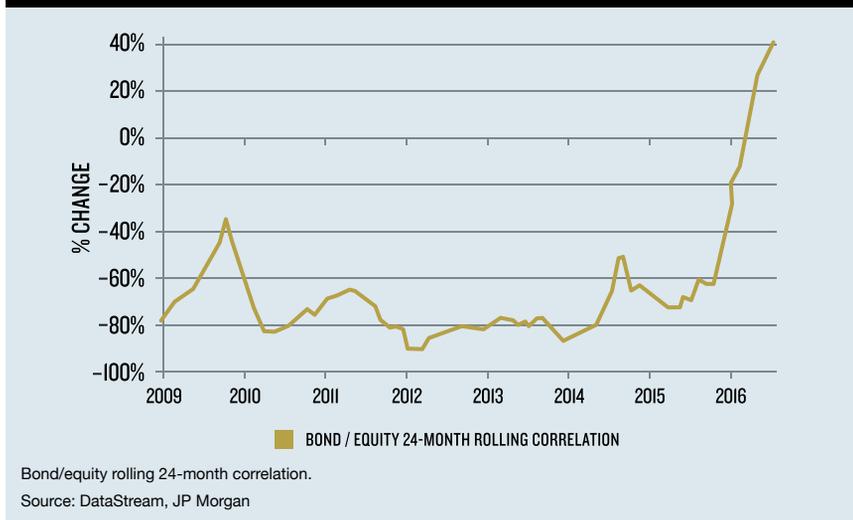
### Digital Is Different

From a mathematical perspective, the most fundamental assumption of MPT is that outcomes follow a normal or bell-curve distribution. It's the reason that combining positions can allegedly create optimal risk-reward tradeoffs.

That may have been a fair description of the world when MPT was born. The rise of the digital economy, however, is creating a different dynamic. As Brynjolfsson and McAfee argue in *The Second Machine Age*, digital competition is a different beast.<sup>6</sup> It tends to produce winner-take-all outcomes that more resemble a Pareto curve than a bell curve.

That's because of the way digital success breeds more success. Digital companies benefit from powerful first-mover and network-effect advantages. They face low

**Figure 4: Increasing Correlations**



**Table 1: Industrial vs. Digital Economics**

| 2009: Big 3 Autos       | 2014: Big 3 Digital     |
|-------------------------|-------------------------|
| \$250 billion revenue   | \$250 billion revenue   |
| \$36 billion market cap | \$1 trillion market cap |
| 1.2 million employees   | 137,000 employees       |

Source: Business Insider

**Figure 5: Winner Takes All**



costs of manufacture, distribution, and production; and, through hyper-rapid iteration, they build an ever-increasing set of benefits for their user bases. Dominance leads naturally to more dominance. The physical limitations that thwart market control by one or two industrial companies don't apply, and the resulting economics are very different (see table 1).

The persistence of these advantages is easy to see in a stock chart such as the one shown in figure 5.

Importantly, this phenomenon won't be limited to a few tech companies. As the digital revolution spreads, similar patterns will appear in more and more sectors. Just think what Uber and Airbnb already have

done to two classic businesses. No part of the economy is immune.

This has profound implications for traditional investing ideas. For example, the core idea of passive approaches is to generate average performance as inexpensively as possible. That might be a worthy goal in a bell-curve world. But average is not what you want in sectors where only one or two companies dominate profits.

In the non-bell-curve world, MPT's most basic measurements and prescriptions "optimize" a portfolio into inferior returns.

Put more succinctly: Would you rather own Google or an ETF of all paid-search companies?

### Market Structure

The rise of hair-trigger algorithms controlling huge volumes of assets, the deterioration of bond market liquidity, increasing globalization, and even the proliferation of ETFs have changed the ways markets do—and even can—react to stimuli.

On May 6, 2010, at 2:32 p.m. Eastern time, the "flash crash" was born. U.S. stocks plunged so chaotically that General Electric

traded at \$0.01. Subsequent investigations blamed a feedback loop of high-frequency trading algorithms. That was not your father's volatility.

Such incidents have become more frequent, for several reasons. One is the unpredictability of the policies of central bankers and government officials. When surprises are supercharged by high-frequency-trading bots, impressive consequences can result.

Consider "Frankenshock," which surprised markets in January 2015 after the Swiss National Bank altered its fixed limit on the exchange rate with the euro, causing the Swiss stock market to set a 52-week high and low in the same week (see figure 6).

And then, on October 15, 2014, the world's most liquid market, in the world's safest security, seized up. In the blink of an eye, prices of the U.S. 10-year Treasury bond moved seven standard deviations further than the intraday norm. (How's that for defying expected risk expectations of a standard MPT calculation?) The culprit once again appeared to be a self-reinforcing loop of algorithmic trading overwhelming a rickety market.

Like everything, flash crashes keep modernizing. The two-minute drill that took the British pound down 6 percent on October 7, 2016, featured all the same factors—high-speed algorithms, policy and political surprises, an overwhelmed trading system—with globalization added (see figure 7).

According to Bloomberg, non-bank high-speed traders have tripled their presence in the foreign-exchange markets over the past three years to \$200 billion a day.<sup>7</sup> Because there is no single foreign exchange market—it's a collection of numerous trading systems around the world, without a single regulator or even price-reporting system—there's no way to prevent more of the same in the future.

These are more than just interesting examples with few implications for average investors. Much has been written about

Figure 6: 52-Week High to 52-Week Low in One Week

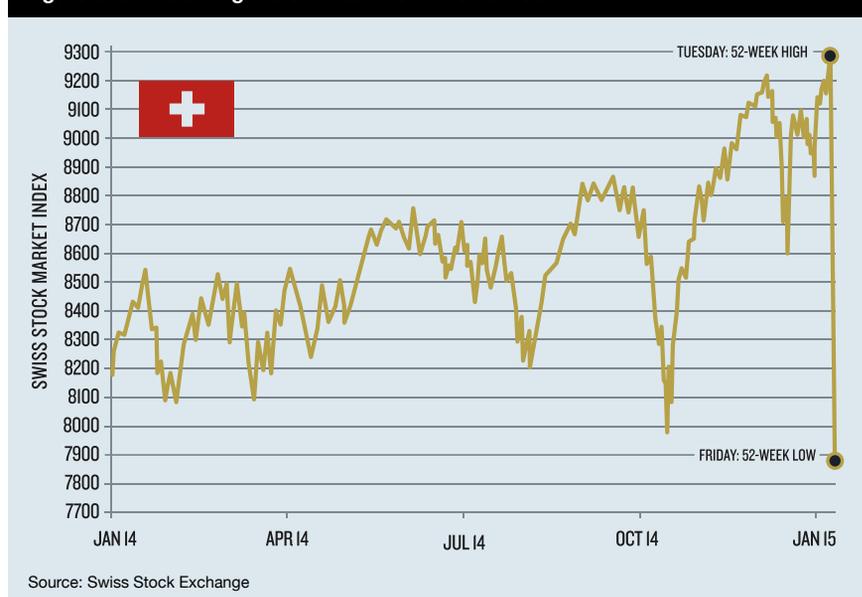
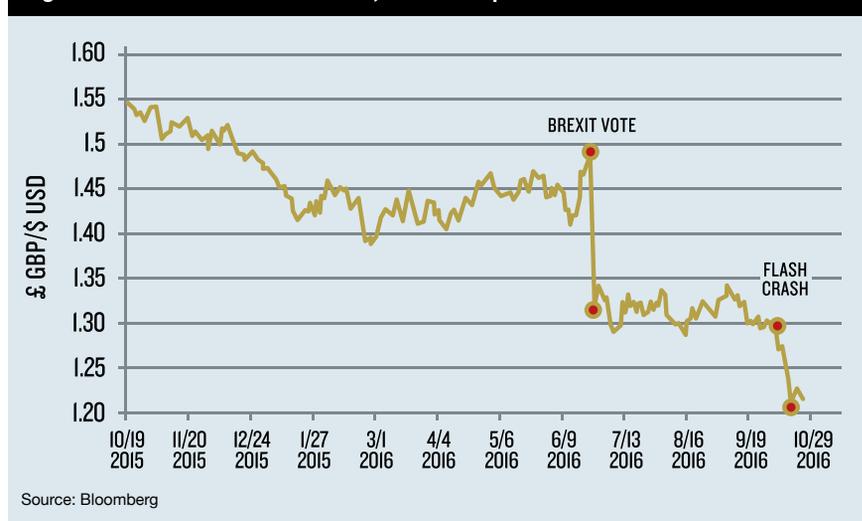


Figure 7: Three Months Post Brexit, Pound Drops 6% in 2 Minutes



mounting illiquidity in the bond markets, but just one statistic tells the tale: Of the 150,000 or so bonds held by ETFs and index funds, perhaps 10,000 trade as frequently as one time a day. The Fed has warned, “As ETFs may appear to offer greater liquidity than the markets in which they transact, their growth heightens the potential for a forced sale in the underlying markets.”<sup>8</sup>

That’s a recipe for a sudden repricing event that would leave deep scars on average investors, whose misplaced faith in MPT assumes liquid and efficient markets, no information advantages, no forced sales, and rational decisions. If only.

### Globalization

When MPT was developed, the United States was contributing the hefty majority of the world’s gross domestic product (GDP) and thoroughly dominated its capital markets. Events outside our borders had limited impact on the behavior of U.S. securities, and we could, effectively, ignore the rest of the world as we constructed portfolios. As we’ve already seen, that’s no longer the case.

Today, the U.S. share of global GDP has shrunk to about one-third and roughly half of S&P earnings are generated overseas. Foreign investors fund U.S. deficits, hold trillions of our bonds, and supply low-cost parts and goods that are integral to the U.S. economy.

Global commerce has been relatively stable for many years, but now it faces dramatic risks: the Trump administration’s avowed intent to renegotiate trade deals and the reprisals such actions might bring; discordant central bank policies; the instability of the eurozone and, particularly, its banks; and rising political and military concerns ranging from terrorism to an emboldened Russia.

But China is the biggest wildcard of all. Global industrial and commodity producers, exporters, transportation companies, and all their suppliers and investors have placed massively leveraged direct and

indirect bets on China’s continued torrid growth. Through that leverage, China can export both deflation and inflation. No one can guess how economies and policymakers can or will react to China in the next several years, but surely none of the potential consequences can be anticipated by MPT.

### The Proliferation of Volatility-Targeting Strategies

By the sheer force of their popularity, the formulas of MPT now directly impact, instead of merely describe and predict, portfolio performance. Armies of volatility-targeting managers follow the same basic playbook, triggering self-reinforcing feedback loops that overwhelm, and defeat, the formula’s expectations of future price action.

Indeed, a cynic might say that the single most-profitable application of MPT has been its use to accumulate assets under management (AUM) in risk parity and related volatility-targeting strategies. The idea here is to change allocations as the markets move so that the portfolio maintains a fixed risk budget, and a manager who equalizes the risk contribution of asset classes has achieved risk parity. This strategy has become incredibly popular, and estimates now place AUM of the gaggle of related strategies at well more than \$1 trillion.<sup>9</sup>

That kind of size matters. These managers and their strategic brethren will tend to make the same trades at the same time in response to downward volatility, thus accentuating that volatility and causing more selling, in a self-reinforcing pattern. We saw the trailer for this coming attraction on August 24, 2015, when U.S. stocks suffered a bout of losses at the open. Volatility management strategies had been built on the premise that bonds would rise in such a case, which would keep overall volatility targets in line, but that didn’t happen. Partly because the Chinese government needed to sell bonds to raise cash at the same time, bonds also came under selling pressure.

So the risk contributions of both stocks and bonds suddenly rose, exceeding stated total volatility targets. The only response was

to quickly reduce positions in both, which exacerbated everyone’s need to reduce them further. Waves of self-reinforcing selling ensued.

Given all the dollars invested on the same idea, we can assume that more such episodes await. MPT is, in this way, a victim of its own success.

### Panoramic Portfolio Construction

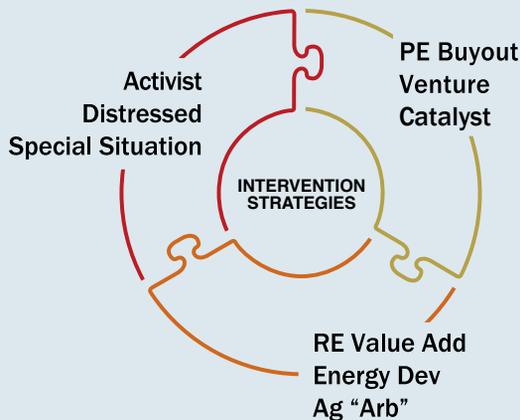
For all these reasons, it’s time to look beyond artificially constrained formulas that attempt to predict the future based on the past. But the value of a more modern approach goes beyond client outcomes: Precisely because so much of the automatic investing universe is built on MPT, advisors who can address the formula’s flaws have a rare opportunity to demonstrate their value in the rising sea of sameness.

A more sophisticated approach starts with goals-oriented portfolio construction. Many institutions have embraced this framework, founded on the idea that investors are best-served by building portfolios based on prioritization of investment goals (such as income or purchase power protection), rather than through standardized asset allocation models based on risk tolerance. (Note that risk tolerance itself is built on standard assumptions that the bond market proved wrong last fall.)

Given the real-world factors and rich valuations noted above, such goals are unlikely to be achieved solely through U.S. stocks and bonds. Advisors should consider incorporating other investment choices, several of them new, into panoramic portfolios that are better equipped for the current environment.

Several products now offer accredited investors access to quality private equity, long the bedrock of institutional portfolios. International developed markets tend to offer better valuations than U.S. markets do, and they stand to benefit more from future central bank policies. Emerging-market debt and equity also can offer greater return prospects than their U.S.

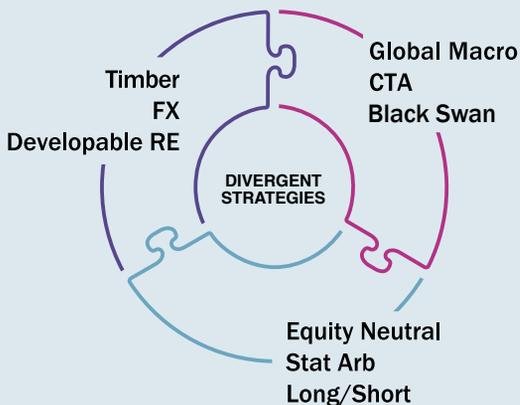
**Figure 8: Intervention Strategies**



**Figure 9: Reflation Strategies**



**Figure 10: Divergent Strategies**



counterparts. Bank and floating-rate loans provide income with better protection against interest-rate and duration risk, as can master limited partnerships and royalties. Long-short equity and credit products, whether in “40 Act” wrappers or not, can offer better risk-reward relationships than many long-only assets at a time of very high valuations. The list goes on, but the point is that a world of new risks and opportunities can best be met through a broader array of diversification options.

That’s fine, but exactly which kinds of approaches are most likely to do well in today’s environment? Three strategy lenses suggest themselves right now: intervention, reflation, and divergent.

**Intervention strategies** are those in which the asset manager directly acts at a position-level to create value, rather than simply relying on passive security selection (see figure 8). Private equity, activist, and distressed debt managers are good examples. In each case, value can be created by direct intervention and the application of expertise, specialized knowledge and non-public information, strategic relationships, negotiation skills, and the like. When the public markets are fully priced, such hands-on methods can offer the better profit opportunities.

**Reflation strategies** refer to those that should benefit from rising rates and the inflationary pressures expected if global governments finally get aggressive with fiscal stimulus (see figure 9). On the equity side, this might include small caps, financials, and international stocks; on the credit side, bank loans, high yield bonds, and Treasury inflation-protected securities; and among real assets, real estate development, infrastructure, and natural resources.

**Divergent strategies** are those few that are truly uncorrelated to overall markets (see figure 10). Divergent strategies could be particularly important as the value of bonds as volatility buffers fades. Here, one can consider commodity trading advisors

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and global macro managers, statistical and other quantitative arbitrage strategies, and equity-neutral and long-short funds.

We can't predict the future, but sophisticated advisors can, and should, handicap it by looking at the world as it is, rather than as a formula thinks it should be. A goals-based, panoramic, situational approach to portfolio construction can do that, and in the construction process demonstrate value for clients that they cannot obtain with any automatic investing solution.

### Conclusion

Today's markets are driven by factors that were nonexistent and unforeseeable in 1952. Policymakers have distorted asset values, driven up correlations, smothered volatility, and created historic levels of duration and interest-rate risk. But risks and opportunities also are being driven by

other important dynamics not accounted for by MPT: the digital economy, globalization, high-speed automatic trading, and even, ironically, the overwhelming prevalence of MPT itself.

Advisors should therefore eschew familiar risk-optimized asset allocations (which, in any case, are literally freely available to investors). Instead, they should provide greater value to clients by constructing goals-based panoramic portfolios tuned to today's realities. ●

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### Endnotes

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2. See Matt Clinch and Geoff Cutmore, "UBS' Weber warns on danger of 'massive interventions' from central banks," October 10, 2016, <http://www.cnbc.com/2016/10/10/ubs-weber-warns-on-danger-of-massive-interventions-from-central-banks.html>, last accessed January 2017.

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6. See Erik Brynjolfsson and Andrew McAfee (2014), *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies* (New York: W. W. Norton & Company, Inc.).
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