FIVE MYSTERIES SURROUNDING LOW AND NEGATIVE INTEREST RATES
Laurence B. Siegel and Stephen C. Sexauer

Zero and negative nominal interest rates are something new under the sun. In 3800 years of history, we’ve only observed near-zero rates a few times, and almost never negative ones. Of course, real rates have been negative for extended periods, but this is different.

There is much that we do know about the relationship between interest rates, inflation, savings, real capital investment, and productivity growth, but the current situation reveals that there are many important things we do not know. There are at least five mysteries or questions for which we are looking for answers:

1. Why has quantitative easing (QE) and a Fed balance sheet of $4.4 trillion not ignited massive inflation or, at a minimum, a large rise in the inflation risk premium?
2. To what extent are today’s low rates around the world due to central bank activism — Monetary Keynesianism — and to what extent are they due to the market-clearing rate or natural rate being low because of the supply and demand for capital?
3. Do very low, even negative, interest rates stimulate economic growth?
4. Are low rates a market forecast of low productivity growth and hence low returns to capital?
5. What are the costs of this form of financial repression?

When confronted with a set of new, confusing, and difficult conditions the outcome of which can have material consequences to our well-being, we have two powerful tools and we should use them: basic economics and a detailed review of history. We apply them here to each question.

This is a practitioner’s paper. The goal is to define the problems or questions and to offer practical and valuable insights for investment decisions.

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2 See Homer, Sidney, A History of Interest Rates. His data start with the Code of Hammurabi, in ancient Babylon around 1800 B.C.
**MYSTERY #1: HOW CAN QUANTITATIVE EASING, WHICH IN THE U.S. EXPANDED THE FED’S BALANCE SHEET FROM $892 BILLION IN JANUARY 2008 TO $4.4 TRILLION IN APRIL 2016, NOT HAVE IGNITED MASSIVE INFLATION OR, AT A MINIMUM, A LARGE RISE IN THE INFLATION RISK PREMIUM?**

In a remarkable 2014 presentation to the Q Group, a discussion group for directors of research and other executives at investment firms, the Wharton professor Jeremy Siegel gave a credible explanation for this puzzle. In his view, the monetary aggregate that counts for setting the inflation rate is M2. (M2 consists of cash and checking deposits — M1 — plus “near money” such as savings deposits and money market funds.) We are fooled by the tremendous growth in the monetary base, which includes reserves deposited by banks at the Fed, into thinking that the money supply relevant for determining inflation has also grown tremendously. Exhibit 1 shows that M2 growth has been much slower and more stable than growth in the monetary base, which has gone wild.

**EXHIBIT 1**
**GROWTH OF M2 AND MONETARY BASE, 2005-2014**

The Wharton professor Jeremy Siegel credits former Fed chairman Ben Bernanke for this outcome. He said that Bernanke kept a close watch on M2 while expanding the monetary base, essentially manipulating the latter to a high and variable growth rate to achieve slow and stable growth in the former. Without this, Siegel argues, we would have fallen into a depression like the one in 1929 that Bernanke famously promised not to repeat.

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4 At Milton Friedman’s 90th birthday party, Ben Bernanke (then Fed chairman) said, “I would like to say to Milton and Anna: Regarding the Great Depression. You’re right, we did it. We’re very sorry. But thanks to you, we won’t do it again.” [http://www.federalreserve.gov/boarddocs/Speeches/2002/20021108/default.htm](http://www.federalreserve.gov/boarddocs/Speeches/2002/20021108/default.htm)
We can better understand the actions of the Fed under Bernanke’s leadership, and the current low-inflation environment, using our old friend the Quantity Theory of Money: \( MV = PQ \). The money supply, \( M \), times velocity, \( V \), equals the price level, \( P \), times real output, \( Q \). The Fed can observe nominal GDP (that is, \( P \times Q \)) and estimates of price level changes, \( P \), and it can implement policies to push \( M \) up with the goal of minimizing the chances of a collapse in nominal GDP. But the Fed cannot control how much people want to borrow and spend \( (V) \).

So, if the Fed’s goal is to prevent a collapse in prices and nominal GDP — a debt-deflation spiral — it will keep push up various measures of \( M \) as long as observed prices, \( P \), are within the range it is targeting. The Fed has done this. At this point it has accomplished two goals: (1) In the fourth quarter of 2008, it stopped the liquidity runs on non-bank banks and money market funds, and (2) since then it has gone to extremes to minimize the chances of a second Great Depression caused by a debt-deflation spiral.

This leaves us with these questions:

- With its now $4.4 trillion balance sheet in uncharted territory, how does the Fed manage the money supply? We suggest an answer below.
- Interest rates — both nominal and real — are very low. How much of this is due to the Fed? How much is because of other factors? This is Mystery #2.
- Do these low rates stimulate economic growth? This is Mystery #3.
- Are low rates a market forecast of low productivity growth and hence low returns to capital? This is Mystery #4.
- What are the costs of these policies? This is Mystery #5.

The monetary side of Fed’s mandate is price stability, which in the \( MV = PQ \) context means a combination of \( M \) and \( V \) that produces a stable \( P \). The Fed currently defines price stability as 2% inflation. (Whether 2% inflation really is price stability, and whether it is an appropriate goal, is another topic, one we won’t address here.)

But what is meant by “money” today? We live in a new digital world of money where more than 3.5 billion people are connected at a basically zero marginal cost per transaction. They can pay with ApplePay, a Starbucks card, a PayPal transfer, or a Chase QuickPay request. Commercial banks can deposit money at the Fed and earn interest. The nature of money and “near money” is rapidly evolving.

Global technological changes, combined with the expanded role of the Fed and its massive balance sheet, have altered the nature of monetary instruments, but not the underlying principles. In a groundbreaking new article, the University of Chicago economist John Cochrane provides a road map to understanding the connections between the technological changes in \( M \) and \( V \) and the Fed’s balance sheet.\(^5\) Cochrane’s road map leads not to financial Armageddon, where we are consumed by an inflation firestorm engineered by the Fed, but to a more benign result.

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The key, according to Cochrane, is interest on bank reserves held at the Fed. Until 2008, the Fed did not pay interest on reserves, creating a wall between “money” (non-interest-bearing currency and deposits) and investments such as bonds. Interest on reserves means that the wall has been torn down; money and bonds are indistinguishable. (With today’s technology, even equities and real estate can be used as money.) Combine this with the proliferation of new, private-enterprise payment systems, all of which involve forms of interest-paying money, and the result is that the traditional monetary aggregates are no longer tightly connected to prices. No wonder inflation rates cannot be predicted from rates of change in monetary aggregates! QE may have pushed interest rates down and asset prices up, but it did not greatly expand whatever the market thinks money is, so it did not spark high rates of inflation.

**Mystery #2: Are low rates due to Monetary Keynesianism or Supply and Demand for Capital?**

We know that central banks are “doing whatever it takes” to push interest rates down, even to negative levels. We also know that, in the U.S. for example, investment is down and savings are up. Disentangling how much of the drop in rates is from the whatever-it-takes efforts of central banks and how much reflects a drop in the market-clearing price is both very difficult and beyond the scope of this paper. We can, however, offer what we think is a helpful framing and share some thoughtful observations by others.

Here is the framing. Start with the basic rules of supply of and demand for capital. After this analysis, then look to what central banks are doing. This is basically the reverse of the current story that it’s all the Fed, ECB, and Bank of Japan all the time.

Savings are up, mostly due to a rational wealth-rebuilding response by over-levered and over-exposed households, business, and governments to the financial and liquidity shocks of 2008 and 2009. This is completely rational. It also suggests that using low rates to push people to “lever up” again can be viewed as “pushing on a behavioral string.” It won’t work and has very bad unintended consequences — bubbles and Minskyian crashes — if it appears to be working for a time.

Investment is down. What caused this drop in investment? It will take time to disentangle the three dominant effects: (1) less investment as an offset to the overinvestment in housing, finance, and some technologies prior to 2008; (2) a smaller and less rewarding investment opportunity set combined with much higher uncertainty regarding future rules, regulation, and taxes; and (3) the fact that many new investments, such as mobile-phone apps, CDMA micro-code, and gene splicing require large infusions of innovation and human capital but small quantities of physical capital.

Exhibit 2 illustrates the economics: when there is an increase in the supply of savings, the supply curve shifts to the right. When the demand for capital falls, the demand curve shifts to the left. The result is that interest rates fall. This is not complicated, but

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6For example, the Dodd-Frank Act of 2010 is 2,000 pages long and requires 20,000 pages of rulemaking; many of the rules have yet to be written. Any wonder why credit is harder to get and bank profits are down?
is very powerful. What is complicated is estimating the steepness or slope of each curve and then estimating the new, lower price (interest rate) that causes the savings and investment markets to simultaneously clear.

We should also add that when interest rates (and thus expected returns on retirement savings) fall, savers react by saving more, because they want to hold their future income constant. The demand for retirement savings is nearing a peak as baby boomers prepare for imminent retirement, reinforcing this effect.7

EXHIBIT 2
SUPPLY AND DEMAND FOR SAVINGS

We now add the central bank’s efforts to push rates down. While it is beyond our ability to estimate these parameters, others have done so. A recent Bank of England paper, summarized in Exhibit 3, provides a good review of the research performed to estimate these slopes. It then estimates that the 4.5 percentage point drop in real interest rates from 1980s levels to the current lows is largely due to structural changes in the supply of savings (1.6 percentage points), the demand for investment capital (1.4 percentage points), and declines in long-term growth expectations (one percentage point).8 A small amount of the decline, 0.5 percentage points, is unexplained.

7 This effect is opposite that predicted by standard economic models, which suggest that low interest rates reduce savings.

EXHIBIT 3
EXPLAINING LOW INTEREST RATES TODAY

Real interest rates have declined by 4.5% (450 bps) since 1980. A Bank of England study estimates these contributions:

1. Lower trend growth in GDP -1.00%
2. Increased Supply of Savings
   a. Demographics -0.90%
   b. Inequality -0.45%
   c. Emerging Markets surpluses -0.25%
3. Decreased Demand for Savings
   a. Lower price of capital goods -0.50%
   b. Lower public sector investments -0.20%
   c. Higher risk spreads -0.70%
4. Unexplained -0.50%
   \[ \frac{-0.50\%}{-4.50\%} \]

Source: Rachel and Smith, Bank of England Working Paper No. 571

Joachim Fels, the chief economist at PIMCO, interprets the results in Exhibit 3 as saying that the push of interest rates to zero, or below zero, is just a move by the central banks to mark their policy rates to a market rate that reflects the structural changes in supply and demand, and possibly lower long-term productivity and working population growth. While this is an appealing explanation, however, we’d caution that if central banks were really just marking the policy rate to market, they would not have had to expend any resources in doing so. The fact that they’ve spent trillions strongly suggests that there is an administered rate component to zero or negative interest-rate policies. Market rates would be somewhat higher. (See sidebar.)

How does this end? For interest rates, especially rates pushed down by Monetary Keynesianism, we will arrive at a Herbert Stein point where conditions are such that they cannot continue.⁹ We know that widespread negative interest rates cannot continue forever; the idea that a resource today is worth less than the same resource tomorrow is contrary to human nature and to thousands of years of history, and leads to absurd decisions such buying everything one is ever going to need right now. The real...

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⁹ Herbert Stein is widely credited with the saying, “If something cannot go on forever, it won’t” or “it will stop.”
interest rate equilibrates the supply of and demand for real capital — factories, roads, airports, patents, labor contracts. And the demand for real capital, while variable, is not going away. So the very long-term outcome will be driven by fundamental supply and demand factors, rather than by central bank actions; real interest rates will move up above zero. As long as inflation is not sharply negative, so will nominal interest rates. We have not reached the end of history.

**Mystery #3: Do very low, even negative, interest rates stimulate economic growth?**

This sounds like a trick question. If lowering interest rates doesn’t stimulate growth, why do central banks do it?

The difficult truth is: we don’t really know whether low interest rates — either a low level or a decrease in the rate — are a causal growth factor for the economy under most circumstances. Lowering the rate does seem beneficial in emergencies. The Fed’s response to the liquidity crisis in the fall of 2008, which included monetary easing as well as liquidity provision, is widely acknowledged to have prevented a second Great Depression.

The empirical evidence from actual history is clear: there is little to no measured correlation between real interest rates and long-term growth. Sustained economic growth comes from only two things, how many people are working and how productive they are. Labor force participation is primarily driven by incentives and demography. Productivity growth is determined by innovation — new ideas and new ways to do things — and by investment in human and physical capital. That’s it.

Interest rates are just the prices that clear the markets between borrowers and savers.

And the usual rationale for lowering rates — that there are business projects or consumer purchases that are not being made because rates are too high — doesn’t seem to apply. How many consumers or businesses put off buying a house or building a factory because mortgage rates are 4% instead of 3.75%? The mortgage decision will be dominated by household formation, jobs and wages, and the house price. Business investment is more driven by judgment, regulation, and changing technology than by Aa-rated bond yields decreasing from 2% to 1.75%. Yet the current talk about negative rates implies that today’s sovereign rates, which are below zero in over a quarter of the world’s economies, are indeed too high.

Even if one concedes that low interest rates are stimulative in emergencies, calling the current economic condition an emergency is a stretch. And the answer to the question, “Do low rates, applied persistently over time, stimulate sustainable economic growth?” appears to be “no.” Otherwise, after seven years of essentially zero rates, we should be in paradise.

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In the long sweep if human history, Exhibit 4 shows a period that looks much like paradise. From 1890 to 2015 real GDP per capita in the U.S. grew at an average rate of 2.0% per year. At this rate, the standard of living doubled every 35 years. The numbers in modern times, since 1950, are similar. This extraordinary result was driven by protection of person and property, incentives and risk taking, and endless innovation in ideas and processes.

EXHIBIT 4
GROWTH OF REAL PER CAPITA GDP IN THE UNITED STATES, 1890-2015

We are seven years into the era of Monetary Keynesianism.\textsuperscript{11} We employ this term to refer to the use of monetary policy in addition to, or in place of, fiscal policy to regulate macroeconomic activity. What are the results so far? Growth is low, productivity growth is low, and incentives to work have fallen. There is little theory or history to suggest that even more zero or negative interest rate policy (ZIRP or NIRP) and quantitative easing by activist central banks will contribute to long-term growth and wealth creation.

In fact, there is evidence to suggest that policymakers bent on lowering interest rates to stimulate the economy are using the wrong tools. In a recent book, Casey Mulligan of the University of Chicago shows that U.S. policies in response to the 2008-2009 recession, which materially expanded unemployment safety nets and modified

\textsuperscript{11} The phrase is of unknown origin but is not ours. Monetary Keynesianism is distinct from monetarism in its advocacy of central bank activism; monetarists usually instead favor stable and predictable growth rates in the money supply. There is also an academic school of thought called Monetary Keynesianism with a slightly different emphasis.
mortgage terms, distorted incentives in both labor and capital markets so as to impinge on investment, income, consumer spending, and growth. If that is the case, the “no limits” approach to continued monetary easing, advocated by Mario Draghi and others, will in the best case only buy time but, in the long run, will have little or no effect and could make matters worse.

**MYSTERY #4: ARE LOW RATES A MARKET FORECAST OF LOW PRODUCTIVITY GROWTH AND HENCE LOW RETURNS TO CAPITAL?**

Bart van Ark, the chief economist of the Conference Board and a long-time student of productivity growth, frames the question this way: If real rates are low, then could it be that the markets are signaling that future productivity will be much lower than in the past.

What does basic economics tell us about this possibility? In the neoclassical model, the interest rate will equal the marginal contribution of capital. Hence, if the currently low real rates stay at these levels, then it may well be that the hard-to-observe returns to capital have fallen, as will GDP growth and corporate earnings growth. This state of the world pushes down the slope on the graph in Exhibit 4.

Robert Gordon of Northwestern University makes the case that we have already entered a prolonged period of lower innovation and growth, and that the gains of the past century were an outlier not to be repeated. Yet, given the record of the last 125 years and the current innovations in medical and digital technology, the late Gary Becker, a Nobel Prize-winning University of Chicago economist, asked why the slope in Exhibit 4 could not expand from 2% to 3% or higher, observing that there is no law of physics limiting innovation, know-how, and human ingenuity. This controversy continues, with no clear answer.

But what are markets telling us? Are lower interest rates signaling lower growth? What is a practitioner to do today?

We do know that we are currently in a low interest-rate world and low nominal-growth rate world. We do have some sense of the causes — recent overinvestment, the aging and reduction in size of the labor force, and declining educational attainment. But we don’t know if these changes are temporary or permanent. Moreover, we have experienced profound disruption from wireless and internet-based technology and we don’t yet know how much and how deep the gains from these innovations will be, as they come with very long and variable lags. We do not know how labor markets — for

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13 On January 21, 2016, Draghi said there were “no limits” to what the ECB would do to meet its inflation target.


15 At this point, we don’t even know whether these innovations are additive to growth (as measured) or subtractive from it. We are pretty sure that they add to consumer utility, but a cost-saving innovation — which is a fair way to characterize many of today’s technological changes — may go into the national income accounts as a reduction to GDP, not as an addition to it.
the young and the old — will adapt, especially human capital investment and labor force participation.

When we add up these considerations, we have three investment takeaways:

- The current evidence is for low returns. Therefore, investments that appear to have high expected returns will be the exception. Some will have easy-to-see risks. Many will have unseen latent risks. Until the data change, it’s a low-growth world.

- Growth, and high expected returns, will be valued at a high premium. The problem is that everyone knows this and both valuations and volatility will be high. Earnings volatility will be amplified by the effect of discounting at very low interest rates.

- Productivity and long-term growth are influenced far more by policies regarding taxes, property rights, and regulation than by any central banking practices. Countries, industries, and companies associated with good policy regimes will grow faster.

In summary, the prudent approach is to budget for lower growth expectations until the evidence changes, look for growth tied to fundamental changes in policy and technology improvements, and keep in mind that almost all valuation models become ineffective when the discounting rate approaches zero. In the very long run, the prospects are better because there is no reason to believe that the pace of knowledge accumulation, which is at the heart of economic growth, has changed.

Mystery #5: What are the costs of this form of financial repression?

Financial repression is a term used to characterize policies that lower the value of government debt held by savers, typically through negative real interest rates. Such rates can be achieved either through unexpected inflation, as in the 1970s, or through the very low or negative interest rates that prevail today. There are immediate and direct costs of financial repression, and there are eventual and indirect costs. The latter, and in fact the costs of any policy, show up in the slope in Exhibit 4 — that is, the growth rate of GDP or economic activity — and in the way that the fruits of this activity are distributed (and “redistributed”) among labor, capital, and other claimants.

In the nearer term, the costs of financial repression include (1) interest that would otherwise be paid to savers but that will not be, (2) knock-on effects on equity and other asset returns, and (3) costs from distorted incentives. These costs need to be netted against benefits, which the ECB defines as the avoidance of a “devastating deflation.” For the U.S., Coleman and Siegel [2015] estimate that the effect of zero rates on savings and low prospective returns on equities is a wealth transfer from

16 The most obvious distortion caused by low interest rates is that investors seeking acceptable rates of return in the capital markets are forced farther out on the risk spectrum, and have bought real estate and equities as fixed-income substitutes. That is, they are taking risks they do not want to take and formerly did not need to take in order to achieve their income or return objectives.
investors to issuers of more than 5% of GDP in each year that the repression takes place; the issuers include households, corporations, and governments. These authors acknowledge that benefits of the financial repression policy need to be netted against this amount, but we do not know the net cost of the policy.

This much we do know: sovereigns have a long history of managing large debt balances by pushing interest rates down to reduce their interest bills. This has been the case throughout the QE era — the interest cost to sovereigns has gone down even as debt balances have increased. In the U.S., debt held by the public was $5.8 trillion in 2008 and expanded to $13.1 trillion in 2015. At the same time, U.S. government interest payments fell, from $253 billion in 2008 to $223 billion in 2015. An amazing outcome: debt balances were up 125% and debt service costs were down 12%. It’s nice to own a central bank!

It is hard to assess what would have happened if rates had not been held at zero for the seven subsequent years. Mario Draghi, the president of the European Central Bank (ECB), recently said, “We deem that the counterfactual would have been a disastrous deflation.”

But a high-interest-rate policy is not the only alternative. What would have happened with a more normal low-rate regime, say, the Treasury bill yields of 2% or 3% that have usually prevailed in recessions? It is impossible to say. Siegel and Coleman [2015] argue that the implied tax on savings from very low nominal rates, and negative real rates, has deprived the economy of an important source of funding for consumption, and that we would have been better off if rates had not been pushed to zero except in the depth of the crisis.

What is clear is that QE and Monetary Keynesianism are not an unalloyed benefit. As with any policy implementation, there are winners and losers. Borrowers, including governments, are among the winners. For retirees, the costs can be acute. In addition to no income on savings balances, life and health insurance premiums go up, even on existing policies. When the economics of a commercial product are based on positive interest rates and an upwardly sloped yield curve, financial repression increases the costs of the product; and retirees pay it or they let the policy lapse. There will be hundreds of thousands, perhaps millions, of people affected by this cost increase.

The counterfactual — what the general equilibrium levels of income and income distribution without financial repression would have been — will be subject of many years of research. Even after the research has been performed, it will be hard to form general agreements. After all, there are still deep and fierce debates on the costs and

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benefits of government activism before, during, and after the Great Depression that ended 76 years ago! Thus, from an investor’s vantage point, it’s best to focus on the three variables that will drive markets: sales growth, income growth, and actual (as opposed to forecast) interest rates. Let policy experts research, debate, and try to influence central bank behavior.

CONCLUSION
Don’t panic. This, too, shall pass — but not before it costs you a lot of money if you’re a saver; not before it saves you a lot of money if you’re a borrower. Don’t believe that all the power is held by central banks all the time — they hold powerful levers, but they are not the rock stars of economic growth. We are, by going to work, innovating, economizing. Real growth — GDP, sales, profits, and jobs — comes from only two things: more people working, and people working more productively.

So what to do and how to understand today’s unusual events and prices: Use the basic economic tools we all know and have access to. Apply some history. Finally, use basic statistical thinking: Enumerate the possible outcomes or scenarios, estimate (guess) the probability and consequences of each, and update your guesses as new data and understanding arrive.

Here’s our list.

Scenario 1: A debt-deflation cycle that leads to rolling financial and fiscal disasters, resulting in a Japan-like experience where productivity grows at 1% or less, the labor force shrinks, and prices slowly fall. The Japan scenario.

Scenario 2: The U.S. becomes the mid-twentieth-century United Kingdom where, paraphrasing John Maynard Keynes, economic and financial hegemony has irrevocably passed from the U.S. to Asia, especially China. We call this the Low Growth and Redistribution scenario.

Scenario 3: A long and winding recovery, but a recovery nonetheless, toward the historic long-term U.S. productivity or real GDP per capita growth rate of 2%, plus 0.6% to 1% labor force growth, with real sales, profits, and jobs showing similar numbers. This is the Success of Monetary Keynesianism scenario.


21 While the trend in labor force growth is downward, the numbers can be improved by immigration, family-friendly policies intended to attract women into the labor force and keep them there, and more flexibility in employment law and practices to attract men back into the labor force who are currently not in it.
Scenario 4: An explosive and hard-to-control inflation spiral as the seven years of central bank “money printing” lead to a borrowing, spending, and wage-price inflation. Central banks struggle to contain the monetary fires they set as they find they are “behind the curve” with the inflation genie out of the bottle and out of control. This would be the Argentine scenario, and would constitute a slow-motion debt default similar to what happened over 1949-1981.

Scenario 5: Sustained economic deterioration until those affected become motivated enough to demand radical growth-oriented policy reforms. In the past, successful reforms have included simplified and lowered taxes, government spending focused on the building of physical, intellectual, and social capital, enhanced incentives to work and save, reduction in regulation, and growth-oriented immigration reform. This is the Britain/U.S. in the 1980s scenario, and would lead to a major bull market.

We think the evidence is such that we can throw out, for now, scenarios 1 and 4. We keep them on the list because they are possible, but currently there is little to no evidence they are looming in our near future. But, much as John Maynard Keynes suggested, if the evidence changes, we will change our minds.

Right now, the betting is on Scenario 2, Low Growth and Redistribution, a continuation of the current circumstance. The hope of the central bankers is Scenario 3, the Success of Monetary Keynesianism transmuting to a more traditional growth path. We believe that the best outcome is Scenario 5, consisting as it does of growth-oriented policy reforms that move us rapidly back to a high-growth economy.

It is extremely important in times such as these to be a very long-term investor. Ignore stories of impending Armageddon, promises of routine double-digit returns, and the mythology of central bankers as the new masters of the universe.

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22 Central banks do not “print” money, although that is how the creation of money by central banks is commonly described; rather, they make computer entries creating a central bank liability to a commercial bank; the commercial bank then in turn has an asset at the central bank. The commercial bank can then use these central bank assets to buy bonds (as takes place during times of QE) or to lend to borrowers. A good example of these balances can be seen in the U.S. Federal Reserve H.4.1 Statistical Release at www.federalreserve.gov/releases/h41/current/h41.pdf.