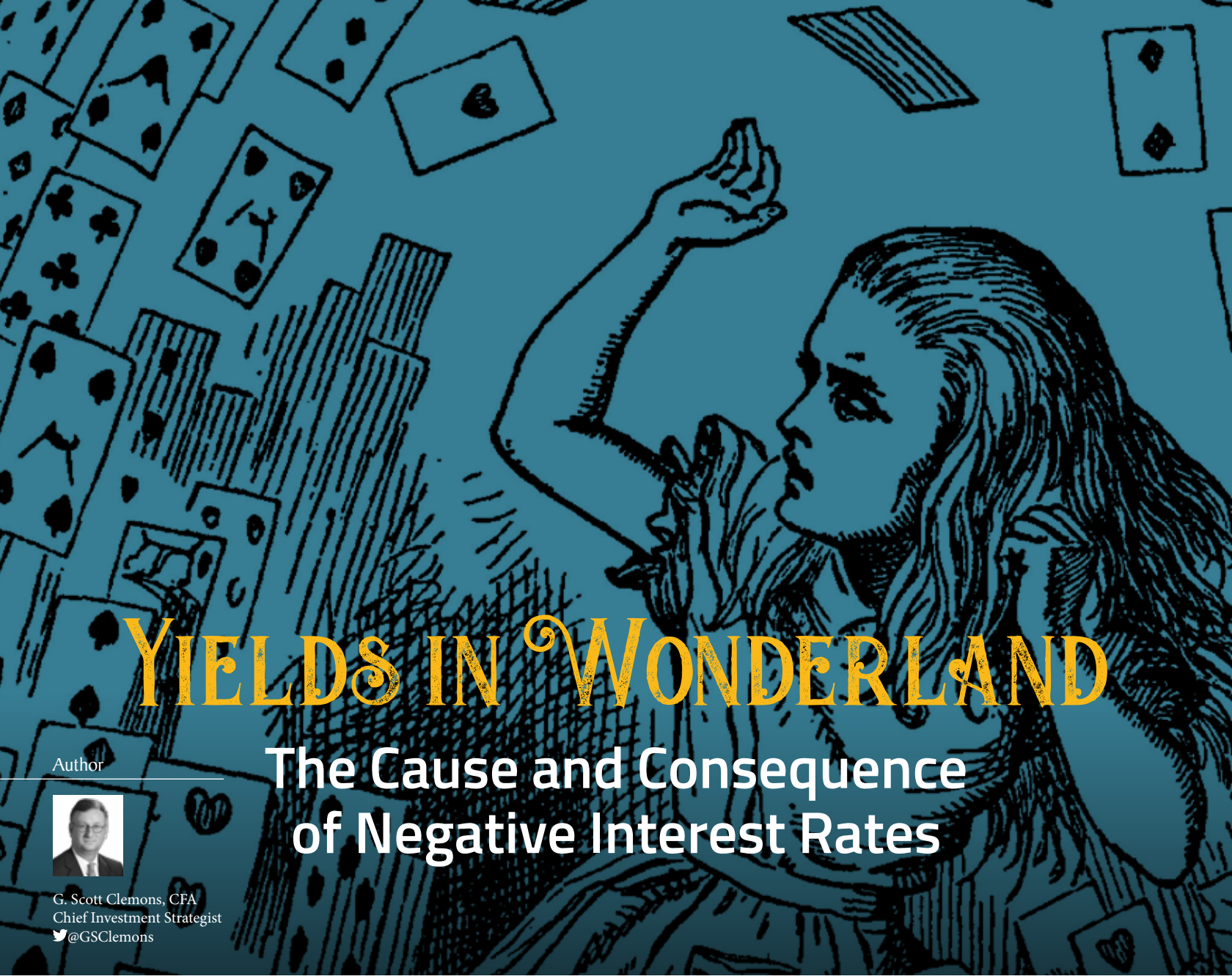

Yields in Wonderland

The Cause and Consequence of Negative Interest Rates

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Alice laughed. "There's no use trying," she said, "one can't believe impossible things."

"I daresay you haven't had much practice," said the Queen. "When I was your age I always did it for half-an-hour a day. Why, sometimes I've believed as many as six impossible things before breakfast."

Alice's trips to Wonderland and Through the Looking Glass introduce her to one impossible sight after another, from talking flowers and mad hatters, to disappearing cats and homicidal queens. Throughout her journeys, she encounters characters and situations that challenge her sense of reality and grasp of language. Although everything Alice sees defies what she knows to be true, these new realms possess a strange sort of internally consistent logic, abiding by their own rules, if not those of the real world.

Over the past few years investors have stepped through a looking glass of their own, and into a world in which one gets paid to borrow money, and in turn must pay to lend it. A fundamental theory of finance is that money has a time value, and that investors should be rewarded for parting with it. This reward, or yield, should rise with the possibility that they might not get all their money back (credit risk), as well as the length of time they are separated from their funds (duration, or maturity risk).

And yet here we are, in an environment where the combination of money and time does not offer a reward. Money, at least in some parts of the world, has no time value, or even negative time value. Alice would likely agree with the 21st century investor that the current state of affairs only gets "curiouser and curiouser." In the pages that follow, we explore the theory and practice of negative interest rates, as well as the economic and market implications.

Negative Interest Rates In Theory

Monetary theory is based on the principle that central banks can influence investment and spending—and therefore economic activity—by lowering or raising the cost of money. Interest rates are nothing more than rent on money; what you pay to borrow it from others, or what you earn by forgoing current consumption and lending your money to someone else. Lower interest rates make it easier to buy a car, refinance a home, or, in the corporate world, build a new factory and hire people to run it. All this spending and investing boosts Gross Domestic Product (GDP).

Too much of a good thing like economic growth can, however, lead to rising prices and inflation, at which point a central bank can try to stifle overconsumption by raising interest rates to curtail spending and investing before inflation gets out of hand. Interest rates are blunt tools, and central bankers are fallible humans with imperfect information. When central banks inevitably leave interest rates too low for too long, or raise them too quickly, an economic cycle ensues.

The transmission mechanism for central bank policy is the commercial banking sector. The Federal Reserve and the European Central Bank do not dictate interest rates that consumers pay in the United States and Europe. Instead, by lowering or raising the interest rates that commercial banks earn on reserves that they are required to retain for regulatory purposes, a central bank can encourage commercial banks to lend more money (rather than earn paltry returns on reserves), or rein in lending (in favor of healthy returns from reserves held at the central bank).

Inflation is an explicit objective of central bank policy, at least in the United States, but at the same time complicates the effectiveness of monetary policy because what really matters economically is the level of interest rates relative to inflation; that is, real interest rates. Although a central bank sets nominal policy rates, the level of those rates relative to inflation is what really creates the incentive for commercial banks to lend more money into the real economy.

A Brief History Of Negative Interest Rate Policy

Central banks around the world lowered interest rates to historically low levels in response to the global financial crisis of 2007-2009. At the same time, many central banks bought bond assets on the open market, and expanded their balance sheets to provide liquidity and exert downward pressure on longer-term interest rates, providing even further monetary stimulus and support. As the crisis passed, policymakers expected that economic growth would resume, leading to more inflation, thereby allowing them to raise nominal interest rates back to more normal levels while still maintaining relatively modest real interest rates.

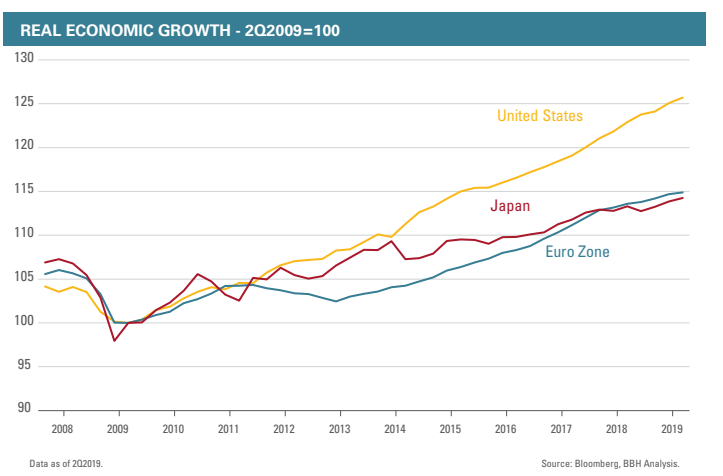
It never happened. Or, at least, it hasn't happened yet. Major developed economies have grown over the past decade, but not by much. The nearby graph measures the real economic growth of the United States, Japan and Europe, with each economy indexed to 100 at the beginning of the current expansion. The Japanese economy did not return to its pre-crisis real economic level until early 2013, and the euro zone did not regain its previous peak until 2015. The United States, by comparison, recovered all of its lost economic activity by early 2011, and the real economy in the U.S. is now 26% larger than ten years ago in 2009. The euro zone and Japan are only about 14% larger, which equates to a paltry average growth of only 1.3% for the past decade.

Nominal Versus Real Interest Rates

Assume you are investing money (that is, buying a bond) in a world where real interest rates are modestly positive. If you lend $100 at a 2% (nominal) interest rate when inflation is 1%, a year later you have $102 nominal dollars, but 1% inflation would rob you of one of those dollars. Your ending value adjusted for inflation would be $101. A real interest rate of 1% has increased the purchasing power of your money by $1.

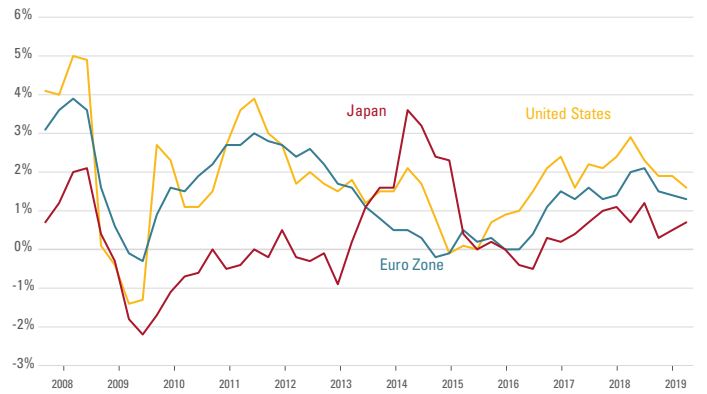
What happens when real interest rates are negative? If you invest the same $100 at the 2% nominal interest rate but with higher inflation of 3%, you still end up with $102 nominal dollars, but only $99 of purchasing power. In this scenario inflation exceeds the nominal rate of interest to your detriment—real interest rates are negative. Your choice is to accept the loss of purchasing power that the bond offers, or pursue other investment opportunities that offer a greater real return. This incentive to allocate capital to higher risk and higher return opportunities is the explicit goal of a negative interest rate policy.

This is an easy and common approach when inflation is at positive and modest levels, but what can central bankers do when inflation falls perilously close to zero, or even turns into deflation? In order to establish negative real rates in a low inflation or deflationary environment, nominal rates must start with a negative sign. It's just math.



Not surprisingly, in the absence of a strong rebound in economic activity, inflation has remained muted as well. Consumer prices in all three economies declined during the worst of the global recession, with Japanese prices lingering in deflationary territory for almost five years. Inflation is slightly positive in the United States, Europe and Japan at present, but none of these three economies show the rebound in inflation that usually accompanies easy monetary policy, low interest rates and an economic recovery.

INFLATION - YEAR-OVER-YEAR CHANGE IN CONSUMER PRICES



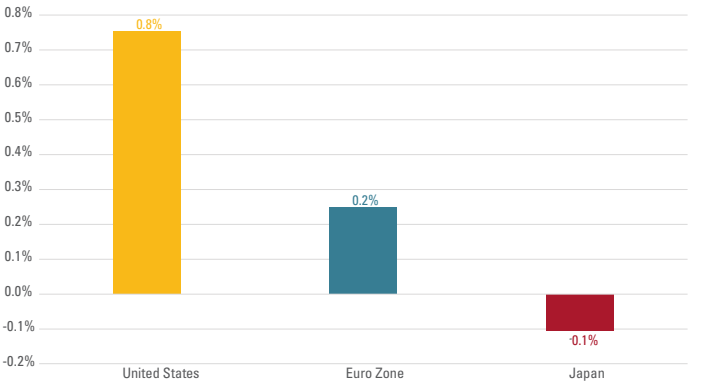
Data as of 2Q2019. Source: Bloomberg, BBH Analysis.

Low or zero interest rates helped cauterize the financial crisis, but a decade later economies in Europe and Japan remain moribund. The combination of anemic economic activity and little inflation has led central banks in the developed world to conclude that if low interest rates saved the day a decade ago, negative interest rates will return the world to more normal economic growth in the future.

This is the cyclical rationale for negative rates. Yet this rationale fails to address the fundamental and secular question of why activity is so weak to begin with. Monetary policy in the form of negative interest rates is tantamount to prescribing a treatment without bothering to make a diagnosis, or, as the Red Queen explained to Alice, "Sentence first—verdict afterwards."

In the long run there are only two variables that drive economic activity: the growth of a nation's labor force, along with productivity of its labor force. Fertility rates in most European countries have been in decline for years, so that population growth throughout the euro zone has averaged a scant 0.2% over the past decade. It could be worse. A combination of falling fertility rates and scant immigration has resulted in a decline in the Japanese population over the past decade. Compare this to the U.S., where population growth of 0.8% has allowed the country to grow its labor force modestly. How are interest rates, negative or positive, expected to address these fundamental demographic dynamics? To the best of our knowledge, no one has yet discovered a causal link between interest rates and fertility trends or immigration policy.

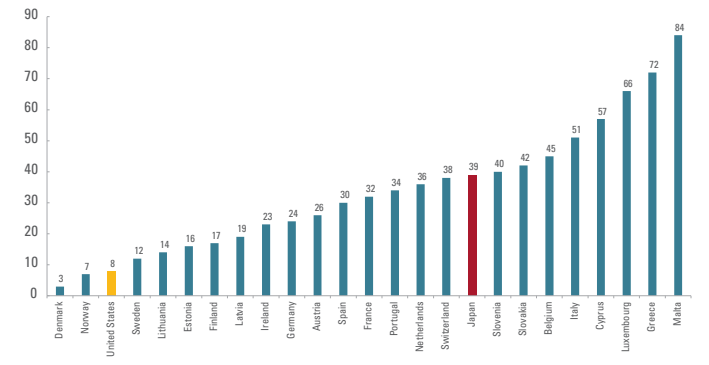
POPULATION GROWTH - COMPOUND ANNUAL GROWTH RATE 2008-2018



Data as of year-end 2018. Source: UN Population Division, BBH Analysis.

Productivity is increasingly difficult to gauge in a world dominated by technology, much of which is (ostensibly) free. As a proxy, consider the World Bank's annual ranking of global competitiveness as measured by the ease of doing business. This analysis encompasses, among other things, regulatory burdens, licensing requirements, prevalence of corruption, the reliability of contract law, access to credit and so on. New Zealand topped the 2018 rankings as the easiest country in which to run a business, followed closely by Singapore. Scandinavian countries ranked well: Denmark was #3, Norway was #7 and Sweden was #12. The United States posts a respectable ranking of #8. None of these countries is in the euro zone. As the nearby table illustrates, members of euro zone generally fare poorly. For comparison, Russia was #31 and China #46 in the 2018 rankings.

EASE OF DOING BUSINESS - 1 = EASIEST BUSINESS CONDITIONS



Data as of 2018. Source: The Wordl Bank, BBH Analysis.

The euro zone and Japan are therefore burdened by the twin constraints of stagnant population growth and (relatively) unfriendly business environments. Unless and until these challenges are addressed and met, economic growth will be hard to sustain.

Negative Interest Rates In Practice

The phrase "negative interest rates" is often used with a certain imprecision, and it is important to distinguish two different causes. Negative interest rates can occur either as a result of explicit

> In the long run there are only two variables that drive economic activity: the growth of a nation's labor force, along with productivity of its labor force."

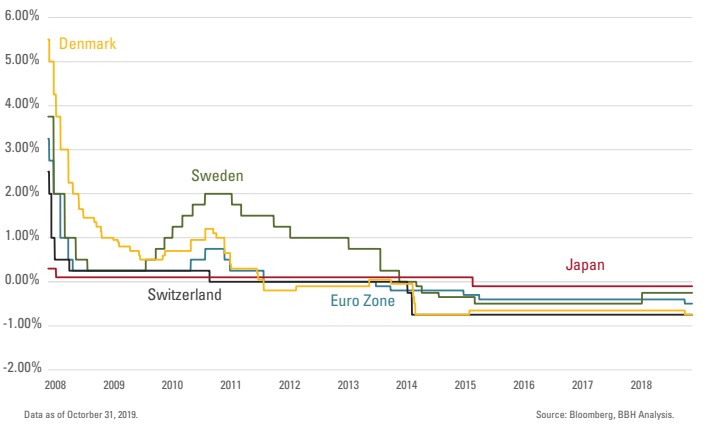
bank policy or through market action. The two dynamics are different, although closely related.

As with most ideas, negative interest rate policy, or NIRP, at the central bank level is not a new concept. A variation on the theme was first proposed by the German economist Silvio Gesell in the late 19th century, who posited that *freigeld*, free money, was the solution not only to economic distress, but also wealth inequality. No less an economic eminence that Irving Fisher, writing during the Great Depression, credited Gesell with an intriguing idea. "Free money," Fisher wrote in 1932, "may turn out to be the best regulator of the velocity of circulation of money, which is the most confusing element in the stabilization of the price level. Applied correctly it could in fact haul us out of the crisis in a few weeks … I am a humble servant of the merchant Gesell."

As the Great Depression came to an end and economic growth resumed in the developed world, interest in the supposed benefits of "free money" or negative interest rates waned. Only in 1970, with the collapse of the gold standard, did the idea return, this time to deter deposits in Switzerland and thereby check the strong appreciation of the Swiss Franc and the resulting burden on Switzerland's important export sector. By 1974 the Swiss National Bank was charging 12% for nonresident deposits, which was akin to a fee or negative interest rate and which rose as high as 41% in early 1975. It didn't work. Money continued to flow into the safe haven of the Swiss Franc, and the dam didn't burst until the early 1980s when Fed Chairman Paul Volcker tamed inflation in the United States and restored confidence in the U.S. Dollar.

This time is different. The five central banks that have adopted some form of NIRP have done so not to weaken their currencies and support exports, but to stimulate bank lending and therefore domestic economic growth. Denmark led the way in June 2012 by lowering its reserve rate to -0.2%, down from a peak of 5.5% just four years earlier. At the same time the European Central Bank (ECB) dropped policy rates to zero, and subsequently cut them to -0.1% in mid-2014. Switzerland followed suit a few months later, and Japan joined the NIRP club in early 2016. At present, policy rates at these central banks range from a high (!) of -0.1% at the Bank of Japan to -0.75% at the Danish Central Bank.

SELECT CENTRAL BANK POLICY RATES



Data as of October 31, 2019. Source: Bloomberg, BBH Analysis.

There are two significant limitations to how these negative policy rates translate into practice. Recall that the purpose of negative interest rates is to encourage banks to lend money rather than build reserves at the central bank. But commercial banks are required to retain a certain amount of reserves for regulatory reasons, so the "penalty" of negative interest rates only applies to reserves well in excess of the legal requirement. For example, the European Central Bank only charges banks for reserves over 6 times the level required by bank regulations. In Switzerland, banks are subject to negative interest rates only on reserves in excess of 20 times the legal requirement. The Bank of Japan tiers its rates on reserves, so that negative rates only apply to about 10% of total bank reserves. Indeed, the BOJ still pays as much as 0.1% (positive) on required reserves. In sum, the negative rates shown in the nearby chart apply to a small fraction of banking reserves.

A second limitation is that central and commercial banks have largely shielded customers from the implications of negative interest rates. If depositors were faced with having to pay to keep money in a bank, the natural tendency would be to take funds out of deposit accounts and stuff it under mattresses. Some banks, however, have already taken the same tiered approach that central banks have, and applied negative rates to large depositors. At the same time, very few banks have taken the further step of offering negative interest rates to borrowers. Jyske Bank, in Denmark, offers a negative rate mortgage, in which the borrower pays back to the bank less than she originally borrowed. This

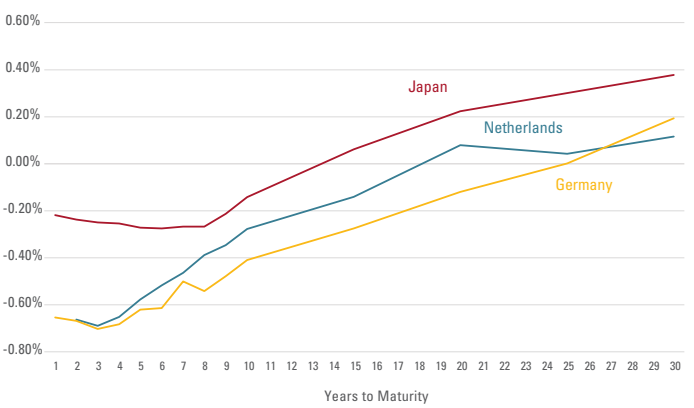
is at present more of a gimmick than a trend, as origination fees make the total cost to the borrower slightly higher. Commercial banks in Denmark are still for-profit enterprises, they just have to be more creative about how they generate those profits when interest rates don't provide much help.

Central banks set policy rates, not the market. And yet market rates have turned negative in some economies as well, not because of direct central bank action, but simply as a result of bond math.

Consider a hypothetical 30-year zero-coupon bond issued at 74 and maturing at par (100). The expected nominal return on this security at offering is 1%, equivalent to the return generated by buying it at 74 today and redeeming it at 100 in 30 years, with no coupon payments along the way. After issuance, the price of this bond depends on supply and demand in the marketplace. If demand drives the price up from 74 to 100, the expected nominal return is zero—a buyer pays 100 today and receives 100 at maturity. If demand pushes prices above 100, the market yield on the bond goes negative. The same math applies if the bond pays a regular coupon: if demand pushes the price high enough, the combination of coupon payments and repayment of principal at maturity results in a negative yield at the point of purchase.

This is, indeed, what has happened across the short to intermediate range of government bonds throughout Europe and Japan. Japanese Government Bonds offer negative yields out to 10 years of maturity; Dutch bond yields are negative for all maturities less than 20 years; and if you want a positive yield on a German bond you have to go all the way to a 30-year maturity to earn an annual yield of 19 basis points.

SELECT YIELD CURVES - AS OF OCTOBER 31, 2019



Data as of October 31, 2019. Source: Bloomberg, BBH Analysis.

The global magnitude of this development is staggering. The total value of sovereign debt trading at negative yields currently stands at $12.8 trillion, down from a peak of $17.0 trillion in late August, but still up almost $6 trillion from a year ago. In other words, investors are holding today almost $13 trillion of government securities with a guaranteed negative rate of return if held to maturity. Wonderland, indeed.

OUTSTANDING SOVEREIGN DEBT WITH NEGATIVE YIELDS

Data as of October 31, 2019. Source: Bloomberg, BBH Analysis.

> "Who buys a security with the expectation of losing money? There are several scenarios in which an investor might willingly, and even rationally accept, a negative nominal yield on a government bond."

The Market For Negative Yields

This raises the obvious question: who are these investors? Who buys a security with the expectation of losing money? There are several scenarios in which an investor might willingly, and even rationally accept, a negative nominal yield on a government bond.

Returning to our earlier discussion of nominal versus real returns, one reason an investor might lock in a negative nominal rate of return is that the real rate of return might still be positive. Recall that real returns are just nominal returns minus inflation, and real returns determine purchasing power. If the inflation measure is itself negative (that is, deflation), then a negative nominal return minus an even more negative rate of inflation would yield a positive real return. Two negatives make a positive.

Consider the zero-coupon bond example mentioned earlier. An investor might be willing to pay 101 for a bond which will mature at 100 if she believes that 100 in the future will have

**One "basis point" or "bp" is 1/100th of a percent (0.01% or 0.0001).*

greater purchasing power than 101 today. Negative yielding bonds, in other words, would provide a hedge against the risk of deflation.

Investors who need to match the duration of assets and liabilities are also natural buyers of long-dated government bonds, regardless of yield. Pension plans and life insurance companies use actuarial tables to calculate the present value of future claims, and are required to match the expected timing of those liabilities with assets of similar maturity. Furthermore, government bonds carry no credit risk which might impair a well-balanced portfolio in the event of default. The return, or lack thereof, on government bonds might therefore be of secondary importance to the role that the asset class plays in matching assets with liabilities while avoiding credit risk.

An investor might also accept a negative yield if other aspects of the trade create a positive return expectation. For example, if a trader is able to borrow at one rate and lend (buy a bond) at a higher rate, then the expected total return on the trade would be positive. Admittedly, this so-called "carry trade" is more obvious when interest rates are positive: if a trader can borrow at 2% and lend at 3%, she can lock in a 1% return. The math still works with negative signs: if the same trader can borrow at -3% and lend at -2%, she still earns a 1% rate of return. Furthermore, if an investor is borrowing in one currency and buying bonds in another, expected currency returns inform the investment analysis as well.

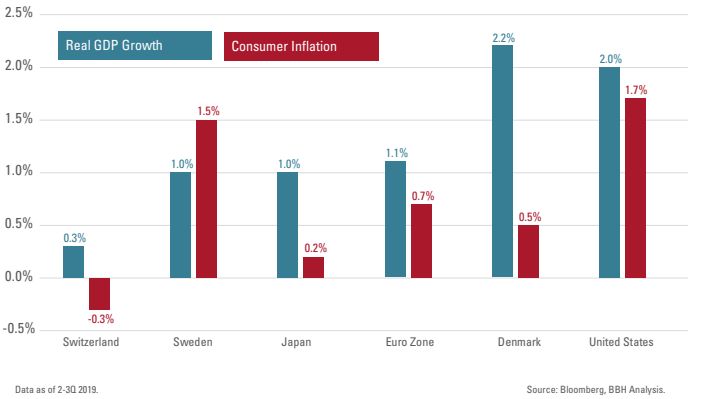
Passive investors who benchmark their portfolios to bond indices will own government bonds with negative yields merely to replicate an index. Returns in this case do not matter as much as tracking error. If an investor defines risk as deviation from an index rather than the prospect of losing money, then she will gladly lock in negative yields rather than run the risk of looking too different from her benchmark.

Finally, as in every financial market, there are always speculators who count on another investor coming along to buy bonds at even lower interest rates and higher prices. This so-called "greater fool theory" works well until it doesn't, as we have seen again and again, most recently in the mortgage and real estate bubble of a decade ago.

Is It Working?

In a word, no. None of the economies discussed in this analysis has experienced a surge in bank lending, economic activity, or inflation since adopting a negative interest rate policy. The most recent economic data show that the euro zone economy as a whole is growing at an anemic rate of 1.1%, and Sweden and Japan are limping along at a similar pace. Switzerland is flirting with recession, and Denmark, at 2.2% annualized growth in the second quarter of 2019, is far and away the outlier of the NIRP club in terms of economic growth. The nearby graph includes data for the United States for comparison.

ECONOMIC SNAPSHOT OF NIRP ECONOMIES - MOST RECENT DATA



Data as of 2-30 2019. Source: Bloomberg, BBH Analysis.

Nor have any of these economies experienced a rise in inflation that might ease the necessity of negative policy rates. Other than Sweden, inflation throughout the NIRP club is well below 1%, and the Swiss economy slipped into deflation in October 2019. By comparison, the United States, with positive policy interest rates, continues to enjoy modest real economic growth and modest price increases.

The crux of the issue is that policymakers are relying primarily on monetary stimulus to solve broader economic problems. As noted above, stagnant labor forces and increasingly uncompetitive business environments cannot be addressed with lower and lower interest rates alone. The diagnosis is easier than the prescription, but Europe and Japan must address deeper issues related to immigration, competition and regulation, if these markets are to achieve economic escape velocity.

Taking a cue from Alice's trip through the looking glass, we concur with Tweedledee, who might disagree with the premise that monetary policy can cure economic ills on its own. If negative interest rates were the right prescription, we should be seeing some recovery or acceleration in activity by now. "Contrariwise," continued Tweedledee. "If it was so, it might be; and if it were so, it would be; but as it isn't, it ain't. That's logic."

Don't Try This At Home

What is the likelihood that a slowdown in domestic economic activity might tempt the Federal Reserve to impose negative policy rates here in the United States? There are no zero probabilities in economics, so the arrival of negative interest rates on U.S. shores can't be ruled out completely. However, there is at present no case to be made for NIRP in the United States. As already noted earlier in this analysis, the U.S. economy is growing (albeit modestly), inflation is positive (but subdued), the labor force is expanding and the economy is competitive.

Yet there are economic threats on the horizon, as always. A prolonged trade war with China might eventually cause a recession in the manufacturing sector and drag down the broader economy. Political uncertainty related to the possibility of

impeachment or the general anxiety that always accompanies an election year might prompt companies to rein in spending and investment, to the detriment of hiring and employment. The mere record length of this economic expansion (a decade and counting) raises concerns that a recession must surely be imminent.

Leaving aside an analysis of current conditions, we readily concur that the business cycle is not dead, and that there will be another recession in the United States at some point. The important thing is that the U.S. has a variety of tools to address an economic downturn and does not need to resort to NIRP to stimulate the economy. The fed funds rate (analogous to negative policy rates at other central banks discussed previously) stands at 1.50-1.75%, up from a range of 0.00-0.25% in the wake of the financial crisis. The Fed currently pays (a positive) 1.55% on excess bank reserves held at the Fed, indicating that it could, if conditions warranted, lower interest rates by as much as 150 basis points before flirting with a negative sign. Similarly, the Fed could reintroduce more aggressive balance sheet measures, known as quantitative easing, to encourage bank lending and economic activity. NIRP in the United States cannot be ruled out completely, but we believe that it is far down the list of available tools to which the Fed would resort in an economic contraction.

Not only is the efficacy of NIRP in Europe and Japan questionable, the unintended consequences in the United States could be scary. It is one thing for policy and market rates to go negative in smaller economies like Scandinavia and Japan, but another thing altogether in the market that serves as the world's reserve currency. It is, for example, unclear how the U.S. money market would work in a negative rate environment. As of September 30, 2019, U.S. households and institutions hold over $3.8 trillion in money market funds as a source of liquidity and store of stable value. This works when funds earn a positive return on their assets and can pay those returns to holders while maintaining a stable $1.00 net asset value. Negative interest rates wreak havoc with this model.

The $1.1 trillion commercial paper market poses a similar conundrum. Companies rely on short-term unsecured borrowing (usually around 30 days) to manage cash flows, bridge funding gaps and meet payroll and other short-term liquidity needs. Funding into the commercial paper market might dry up if interest rates were to turn negative, prompting companies to hold more cash and function less efficiently.

Other untested risks abound. Although retail savers are not yet confronted with negative rates, even low rates might lead paradoxically to more saving and less spending, as people decide to save more in order to generate the same income in a falling rate environment. This challenge becomes particularly acute in aging economies (such as Europe and Japan) as more and more of the population needs a reliable and safe source of income to replace a salary earned during working years.

At an extreme, negative interest rates, if applied to retail depositors, could drive money out of banks and into cash. Negative interest rates would make the $20 bearer bond with Andrew Jackson's picture on it an attractive alternative to a bank account. Savers might decide that the 0% yield on cash beats the negative rate on offer at the bank. Rising cash in circulation (and under mattresses) leads to a host of negative externalities, including petty theft, tax evasion, a booming gray market and armed robbery.

Negative interest rates pose a particular challenge to banks, which rely on a funding spread to drive profitability. A bank's net interest margin is the difference between the rate at which it borrows and the rate at which it lends. If a bank were (for example) to rely on depositors for funding, and pay those depositors a slightly positive interest rate, and then leave excess reserves at the central bank earning a negative interest rate, the resulting compression of the net interest margin would lead to lower earnings. It may be hard to feel much sympathy for large banks, but a well-functioning economy needs a healthy banking sector, and negative interest rates may work against that objective.

Negative interest rates similarly pose a challenge to large investors such as pension funds and life insurance companies, which rely on a safe and stable stream of returns to meet future claims. As the return on traditional government bonds declines, it becomes harder to generate sufficient returns, and managers

Alice tries to explain negative interest rate policies to the March Hare and the Mad Hatter.

are tempted to take on excess risk in non-traditional markets in search of return. This is already happening, and poses a risk to the ultimate beneficiaries of pension plans and life insurance policies should those investments return less than anticipated. Furthermore, because the calculation of liabilities of pension and life companies relies on a discount rate, lower rates raise the net present value of future liabilities, making the asset-liability match harder to accomplish.

Finally, low interest rates generally distort economic reality. If the price of money no longer accurately reflects credit risk, then investors and capital allocators lose an important tool for identifying and measuring investment risk. Easy and cheap access to funds makes bad business models look good, at least for a while, and leads to inefficient capital allocation. This gives rise to "zombie companies," enterprises that remain afloat only because of easy financing, and not because of any other competitive advantage. As long as banks are penalized for holding excess reserves, the incentive to lend without rigorous regard to credit principles poses an economic risk.

Negative interest rate policies are an economic experiment. Sometimes experiments turn out the way one expects. The unintended consequences of negative interest rates in the United States pose uncertainties that, in our opinion, the Federal Reserve would be loath to experiment with.

Implications For Investors

Asset allocation at Brown Brothers Harriman is based on what an investor needs her money to do for her and her family, and the role that various asset classes play in pursuit of these ultimate objectives. In a normal interest rate environment, fixed income plays three roles: bonds are a stable store of value, a supply of reliable income and a source of liquidity. In the current Wonderland of interest rates, however, these three portfolio benefits are fragmented. Investors can still obtain liquidity and stability in traditional short-duration and high-quality bonds, but at the expense of reliable income. Conversely, return-oriented investors can find parts of the fixed income universe that still provide decent yields, but almost always without the liquidity or stability offered by more traditional assets. For most of our clients, fixed income serves primarily as a source of liquidity, and we have pursued that goal by not taking on much duration or credit risk. We find it imprudent to pursue returns in fixed income by trying to anticipate interest rate moves, or by relying on the greater fool theory to provide a willing buyer in the future. Certain areas of fixed income – such as private loans – do offer appealing returns to investors willing to conduct rigorous credit analysis.

We have long believed that the right approach to spending from a portfolio is to rely on the total return of the investments, whether from yield, dividends or realized capital gains. Tax considerations play an important role in this determination. Allowing the level of interest rates to dictate fixed income allocations in pursuit of a set income objective can lead to imbalanced portfolios and inappropriate risk. The time-honored notion of "never touching principal" worked well for decades, when investors could count on fixed income to provide income. Today, it pays to be agnostic as to where return is earned, and therefore how portfolios generate return to support spending.

Low or negative interest rates have implications for other asset classes as well. Throughout the investment universe, analysts have historically relied on a risk-free rate to build present value calculations or discounted cash flow models. Real estate and equity valuations depend on an appropriate discount rate, and relying too heavily on an artificially depressed rate can lead to excessively optimistic expectations. It turns out that the risk-free rate implied by market yields on government bonds might actually be quite risky if used too naively to value other investments. The current environment warrants heightened skepticism.

Conclusions

In another moment down went Alice after it, never once considering how in the world she was to get out again.

Down, down, down. Would the fall never come to an end?

In the opening pages of Alice in Wonderland, Alice chases the White Rabbit down a hole so deep she fears she will never reach bottom. As 2019 comes to a close, we wonder when the fall in interest rates will come to an end, and how in the world central bankers will get out from the potentially vicious cycle of negative interest rate policies. It is possible that August marked the peak in bonds trading with negative yields, as the graph presented earlier in this analysis might hint. Sovereign yields around the world have risen since the beginning of September, returning the longer end of European and Japanese yield curves back into positive territory, albeit barely.

Investors spent the summer of 2019 worried about global economic growth, an escalating trade war, unrest in Hong Kong and the slow-motion train wreck that is Brexit. Those concerns have lifted somewhat over the past few months, but could return in the time it takes to compose a tweet. Our thesis is that unless and until policy makers around the world confront deeper economic obstacles, easier and easier monetary policy will prove futile. Indeed, the cure of negative interest rates may ultimately turn out to be worse than the disease. ■

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