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GLOBAL MARKET COMMENTARY

WHAT TO DO ABOUT HIGHER RATES?

May 2012

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Investors worried about rising interest rates have several options; unfortunately, none of these come without opportunity costs and implementation challenges.

Interest rates continue to bump along near historical lows in many developed countries (Exhibit 1) given weak economic data, worries over the sovereign debt crisis in Europe, and expectations about global monetary policy. Given the asymmetric risk/reward of holding bonds with extraordinarily low yields, some investors have been reconsidering their holdings. Beyond taking defensive steps such as reducing duration or trimming allocations to sovereign bonds, are there ways to position portfolios to capitalize on rising rates?

This market commentary looks at cash and derivative investments that would benefit from higher interest rates. It should not be viewed as a call that interest rates will rise in the near term, nor should it necessarily be taken as a signal that investors "do" anything. Rather, given that some portfolios (or business models) may be more adversely impacted by higher rates,[1] and that some investors may desire more time to familiarize themselves with new funds or tools such as derivatives, this commentary provides a brief overview of potential portfolio impacts and possible courses of action.

Why Interest Rates Might Rise

Forecasting movements in interest rates is difficult and we cannot say with any certainty what interest rates will do in the months ahead. However, given that short-term rates are near zero, we are fairly certain that eventually they will move up. Potential triggers for this move are numerous, including reduced quantitative easing (QE), inflationary pressures, and reduced demand from key buyers such as emerging markets central banks.

A brief recap of recent debt market dynamics is worthwhile. In recent years, corporate and household deleveraging has been more than offset by the increased borrowing of sovereigns around the globe. Despite this massive supply of government bonds, QE and other policy maneuvers have kept interest rates artificially low. High-quality government bonds have also benefitted from greater equity market volatility, which has boosted demand for safe-haven assets.

These dynamics are readily apparent in the market for U.S. Treasuries, the largest and most liquid sovereign bond market in the world. In an attempt to keep rates low and boost growth, the Federal Reserve has seen its balance sheet expand to nearly $3 trillion (Exhibit 2). Efforts have included two rounds of QE by the Fed and last autumn's "Operation Twist," which attempted to suppress long-term interest rates via purchases of longer-dated Treasuries financed by sales of short-term securities. Meanwhile, persistent inflation raises the risk of earning negative real returns. In 2011, U.S. consumer price inflation was 3.0% (Exhibit 3).

There are other prominent developed markets examples. The Bank of Japan recently announced it would increase its main QE program to ¥65

[1] For example, fixed income investors seeking to immunize a liability stream would not necessarily be negatively affected by rising rates as their liabilities would fall in present value terms.

trillion, which would see its balance sheet grow another 7% in 2012. In Europe, the European Central Bank, in conjunction with individual Eurozone central banks, has expanded its collective balance sheet to over €3 trillion with purchases of peripheral sovereign and bank debt. Indications are that these sums will grow further given programs to ease liquidity for banks; for example, the recent Long-Term Refinancing Operation (LTRO) involved lending European banks roughly €1 trillion. Despite slower growth, cost pressures are also building in the Eurozone. In 2011, prices rose nearly 3%, given rising food and energy prices.

Inflationary pressures continue to place central banks in a difficult position, torn between price stability on one hand and a desire to stabilize markets and boost growth on the other. QE efforts will eventually be cut back. However, even if price pressures ease, interest rates are likely to rise unless demand from other investors increases. Foreign central banks, which own around 50% of the U.S. Treasuries held by the public (Exhibit 4), may have numerous reasons to hold back. One of these reasons is economics—it is expensive for the Chinese government to invest US$ proceeds purchased from exporters in low-yielding Treasuries that may then decline in value due to either currency or interest rate fluctuations. More broadly, the sovereign debt crisis has seen numerous downgrades of developed markets sovereigns and resulting capital losses for bondholders such as emerging markets central banks. The flipside is that foreign central bank options for investing foreign currency reserves are limited, though increased demand for assets like gold and local currency emerging markets debt funds suggests that attempts at diversification are increasing.

Should Investors Actually Do Anything?

Perhaps the bigger question for investors is not "if" rates might rise, but whether they should seek to protect portfolios against (or attempt to profit from) such an eventuality. This depends on several factors.

Why? To the extent that interest rates rise because of an eventual economic recovery, some investor holdings such as sovereign and high-quality investment-grade bonds may suffer; however, this is likely to be offset by gains in growth-oriented parts of the portfolio, for which there is ample historical precedent. For example, when U.S. economic growth and interest rates rose from 1993 to 1994 and from 2004 to 2006, commodities and higher-beta equities (like emerging markets) performed strongly.

Putting aside the growth outlook, if rates rise because of inflationary pressures, existing allocations to commodities, oil & gas partnerships, and other inflation-sensitive assets also might offer protection. While recent instances of elevated inflation are limited and some asset classes have limited track records, there is some precedent. The pace of U.S. consumer price inflation went from under 2.0% in 1986 to over 6.0% by the end of 1990. During this period, U.S. and emerging markets equities posted double-digit returns (in US$ terms). In addition, after 12-month rates of consumer price inflation started to rise above 4% in late 2005/early 2006, commodities went on to return over 40% between 2006 and 2007.

The real danger for equity-oriented, diversified portfolios could come in an environment where rates rapidly rise while growth and inflation are subdued. Such environments are uncommon, but elevated levels of government indebtedness create the risk that demand might prove insufficient for ongoing debt issuance. This environment

could see fixed income holdings suffer significant losses, with some equities also incurring losses as markets price in the effects of higher borrowing costs, discount rates, and the impact of slow or contracting economic growth on earnings.

Which Rates? How the shape of the yield curve changes is equally important for portfolios. Are short-, intermediate-, or long-term rates increasing more than others, or are rates experiencing a "parallel shift" where interest rates rise across all tenors by a similar amount? Interest rate curves, via their slope, often anticipate future increases in interest rates, which can cushion the impact on investors of rising short-term rates.

When? Even if one accepts that rates will eventually rise, getting the timing right is far from easy, even for the experts. Based on responses to the *The Wall Street Journal*'s semiannual survey of economists on their interest rate forecasts, our research shows they correctly predict the future direction of rates (much less the scale) less than half the time. From a policy perspective, central banks are likely to try to keep rates low to encourage borrowing and fuel growth, as fiscal options are more limited given bloated balance sheets. Meanwhile, inflationary pressures may prove temporary if growth cools in regions like China and the price of energy and other commodities drops. Continued deleveraging would also reduce the demand for credit, as would moribund property markets and a subdued recovery in employment.

The bottom line is that investors should think carefully about the type of rate increases that would adversely impact them, and then assess whether doing anything is worthwhile given the uncertainty regarding the timing and magnitude of any rate increase and the opportunity costs and implementation hurdles associated with protecting against such risks. The right decision will not be consistent across investors, and will depend on factors such as whether the investor has outstanding debt, can pass inflationary costs on to customers, or has inflexible spending needs that could force the sale of assets during a time of depressed valuations. The tricky part is that while diversified equity-oriented portfolios may have a fairly low sensitivity over the *long run* to changes in interest rates, a sudden spike in interest rates could drive down *short-term* returns and even generate mark-to-market losses.

Options for Investors

Should investors determine that they need to protect portfolios and/or business models against the risk of higher rates, they have several options. The decision to protect against rising rates cannot be made until the cost and implementation hurdles of these options are considered in relation to the benefits they might provide. First, we will briefly describe the options and then evaluate their costs and potential efficacy.

1. Shortening Duration and/or Reducing Fixed Income Allocations

The simplest option for those worried about a sudden increase in interest rates, which may not be driven by better growth prospects, is reducing bond allocations or shortening the duration of existing holdings.

2. Investing in Assets With Floating-Rate Coupons

Bonds with floating-rate coupons such as leveraged loans, corporate bonds, and non-Agency mortgage-backed securities can appreciate in a rising rate environment provided that the environment is not so severe as to materially impact credit quality.

3. Using Derivatives That Pay Off When Rates Rise, Such as Interest Rate Swaptions, Constant Maturity Swap Caps, and Options on Treasury Securities

A number of derivative instruments and fixed income assets allow investors to profit from rising interest rates or changes in the shape of the interest rate curve. We discuss interest rate payer swaptions and constant maturity swap (CMS) caps.

Interest rate swaptions give the owner the option (not the obligation) to enter into an interest rate swap that would begin and end at specific future dates. The underlying swap has a specific fixed rate of interest (strike price), which the owner of the option can choose to pay (or receive) over the life of the swap; in exchange, the owner receives (or pays) a floating rate tied to a specific benchmark (such as six-month Libor). These options are traded over the counter (customized), with each aspect of the underlying swap—as well as the period during which the swaption can be exercised—predetermined. These options can be American, Bermudan, or European-style.

Investors that believe interest rates will rise would choose a "payer" swaption, conferring the right to pay the fixed rate (strike price). Prior to the exercise date, a payer swaption increases in value if expectations of future interest rates rise such that another investor would pay more than the original investor for the option to enter into the referenced swap. Increases in interest rate volatility prior to the expiry of the option also may result in gains for the holder.

CMS caps are options that appreciate when the referenced swap rate rises and function like put options on interest rates. Typically, they have a specific maturity date (a so-called one look option) at which they can be exercised. Some find these options easier to understand than swaptions, because the payoff for a CMS cap increases linearly with the referenced swap rate.

Investors can use derivatives in several ways. Those with in-house expertise in these products can transact interest rate options (which are traded over the counter) with counterparties like investment banks. For those investors that may lack the resources to transact such instruments, specialist managers exist that can both help design strategies and assist with implementation.

4. Tail-Risk or Specialized Investment Vehicles Established to Profit From Higher Rates

Several managers have launched funds that expect to profit from rising interest rates. Some "tail-risk" funds also incorporate this bias, as an unexpected spike in interest rates could have negative effects on several other parts of an investor's portfolio. The strategies vary—some managers make concentrated bets (e.g., using futures to short Treasuries), while others may use derivatives to wager on the future shape of the interest rate curves across multiple currencies.

Evaluating the Options

1. Shortening Duration/Reducing Fixed Income Allocations.

There are opportunity costs to shortening the duration of bond portfolios when the yield curve is positively sloped, whether this is accomplished through cutting the bond allocation or shortening the duration of the existing allocation. In a deflationary environment where rates decline by an equal amount across the curve, shorter-duration bonds (and funds) will see less appreciation than longer-dated equivalents. When short-term rates are low and the interest rate curve is steep, as it is now (Exhibit 5), there is also the risk of short-end rates falling less than those on the long end, resulting in even less appreciation for short-term

bonds. Of course, the reverse is also true—short-term bonds will depreciate less if rates rise, especially if the curve steepens further and the increase in long-term interest rates is greater. A different risk of holding short-term bonds is that the curve flattens (i.e., short-term rates rise while longer-term rates hold constant or even decline). This would most likely occur during a period of central bank tightening that convinces investors that inflation will be stable or contained over the long run.

Historical returns for fixed income funds show, perhaps counterintuitively, that such holdings have performed surprisingly well during periods of rising rates. This is because the carry earned on the bonds often helps offset the mark-to-market losses from higher yields/lower prices[2] (Exhibit 6). However, this historical evidence comes from periods where rates were much higher than they are at present—with rates near zero in some maturities, carry will be limited. Put differently, there is much less cushion to absorb rising rates when yields are around 2% for ten-year Treasuries than when they are around 8%.

2. Investing in Floating-Rate Assets

Investors looking to capitalize on higher rates via allocations to funds that invest in assets with floating-rate coupons should ponder several factors.

Performance. Floating-rate assets may be able to outperform similar fixed-rate fixed income products during periods of rising rates. However, many of these funds are relatively new, and thus their track records suffer from a backdrop of generally declining rates. While over the last decade there was some outperformance during periods of rising rates, the degree of outperformance during these periods was very slight. For example, despite the federal funds rate rising over 300 basis points (bps) from 2004 to 2006, the investment-grade Barclays US$ floating-rate index only slightly outperformed a similar fixed-rate corporate bond index during this period (Exhibit 7), and has trailed its fixed-rate peer by nearly 40 percentage points over its (admittedly short) existence. Similar dynamics are also visible in lower-quality credit. Over the past 20 years, the (floating-rate) Credit Suisse Leveraged Loan Index has underperformed the Barclays High Yield Bond Index by around 240 bps on an annual basis (Exhibit 8).

Basis Risk. Many floating-rate investments have coupons linked to very short-term interest rates like Libor. Coupons and returns may thus disappoint investors if short-term rates stay low while longer-term rates rise. The determination of many developed markets central banks to keep short-term rates low heightens this risk, though opportunity costs could drop in the United States given Operation Twist. So-called Libor floors, which specify a minimum level for Libor that must be used in calculating the coupon payment, are another basis risk particular to leveraged loans. Up to one-half of all outstanding leveraged loans may have Libor floors (including virtually all issued during 2011), with recent deals having an average floor of 135 bps.[3] As a result, Libor would need to rise significantly (around 85 bps from today's levels) before coupon payments rise on these loans.

Credit Risk. Investors should consider the underlying credit quality when selecting a floating-rate fund. This is especially important with assets like leveraged loans, as a weakening economic environment may see lower-quality credits struggle to service debts. Higher rates can also cut both ways for leveraged loan investors. A steep increase in coupon could imperil the health

[2] For more information, please see our November 2010 Market Commentary *Still or Sparkling? Many Bond Valuations Are High, But Proof of a Bubble Is Somewhat Elusive.*

[3] Jonathan Blau, Daniel Sweeney, Karen Friedlander, *2012 Leveraged Finance Outlook and 2011 Annual Review*, Credit Suisse, January 26, 2012.

of the borrower, potentially causing defaults to rise and offsetting the benefit. The propensity of financials to issue floating-rate debt may also make some investment-grade floating-rate funds riskier than assumed; however, to date, senior creditors have largely been protected when banks have been recapitalized or wound down.

Recent History. As interest rates rose during the first part of 2011, inflows into long-only funds that invest in floating-rate assets surged. Flows into leveraged loan funds, for example, totaled nearly $25 billion, while high-yield bond fund inflows were just a small percentage of this amount. This investor demand prompted many managers to expand their loan fund offerings. During the second half of 2011, these trends reversed, as rates fell and leveraged loans underperformed high-yield bonds.

The motivations behind these flows may impact future performance. To the extent that investors have made defensive allocations to loan funds given their standing in the capital structure based upon a certain macro view, allocations may prove sticky. Conversely, if they reflect a tactical attempt to benefit from higher rates that may soon be abandoned, these types of funds may continue to underperform.

If collateralized loan obligations again become a significant source of demand for leveraged loans, investors should also recognize that bouts of market volatility could see price declines, irrespective of movements in interest rates. This is because liquidity squeezes can force leveraged investors to sell assets during market downdrafts, as was the case in 2008–09.

Currently, we view leveraged loans as fairly valued. The discount margin on leveraged loans was around 580 bps at the end of April, above its historical average. While all-in yields on leveraged loans are slightly below those of high-yield bonds given low Libor levels, default rates on leveraged loans are currently below those of high-yield bonds. In addition to carrying a floating coupon, loans' senior position in the capital structure boosts their defensive qualities.

3. Derivatives

There are a number of considerations for investors willing to use derivatives.

Resources. Some investors may lack the resources to evaluate and transact bespoke (over-the-counter) options. In addition, given the embedded leverage in such instruments, prices may fluctuate to a greater degree than is the case with other parts of the portfolio, making more active trading of positions advantageous. To assist with this, investors can hire a third-party consultant on a fee basis, or seek advice from an investment bank. Whatever the approach, there will be upfront costs involved, such as preparing the required documentation and setting up the necessary accounts. Choosing an independent consultant may help improve transparency and pricing.

Behavioral Risks. In our experience, investors can become tired of the performance drag from buying derivatives (should they not generate near-term profits), leading them to cancel or scale back the insurance against higher rates just at the wrong time. Having a detailed plan that establishes a specific risk budget, timeline for implementation, and objectives can help avoid this situation. The expertise of third parties, if involved, can be leveraged to help tailor the hedging program to achieve specific objectives.

Basis/Implementation Risks. Investors may get the macro call right but implementation wrong. For example, the value of a swaption is driven primarily by what happens to *expectations* of future interest rates during the period before which the option can be executed. If interest

rates were to rise in the near term, while *expectations* about rates in the future decline, the option could fail to offset the negative mark to market on fixed income holdings. To reduce basis risks (assuming exact hedges are not executed), a diversified basket of options may be a better bet than using an entire risk budget on one position.

Pricing. Interest rate option pricing has several moving pieces, which include implied volatility, option maturity, and the strike price (future fixed rate of interest at which swap would be conducted). Market participants often focus on the implied volatility, but of greater significance to those with a specific view should be the level of absolute rates (including both current and expected swap rates). To profit, investors must not just prove market expectations (about future rates) wrong, but wrong to a large enough degree to cover the option premium. The difficulty in doing this is increased by the fact that the forward curves off which interest rate options are priced have had a historical tendency to overestimate future rates (Exhibit 9). Thus strike prices (interest rates) have tended to be biased upward, further raising the hurdle for earning positive returns.

Tracking pricing of interest rate options is difficult because expectations about future rates (and thus strike prices) are constantly changing. This makes putting guidelines in place for buying an option with specific characteristics challenging, though targets could be set for figures such as breakeven rates and upfront premiums.

Consider the current example of a European-style payer swaption to enter into a ten-year US$ interest rate swap in five years. Interest rates have recently fallen, which has lowered the strike price (expected ten-year swap rate in five years) by around 140 bps since last June. The difference between the current ten-year swap rate and this forward rate (the so-called forward spread) has also compressed by around 40 bps since last summer (Exhibit 10). This means investors now believe future rates will be lower relative to today's rates, making it easier to profit if rates unexpectedly rise. Somewhat offsetting these positives is that implied volatility for these options has risen substantially (Exhibit 11), and is quite high on a historical basis.

The net result is that the upfront option costs are similar to where they were last summer (689 bps for an at-the-money forward [ATMF] option), but the level (interest rate) at which the investor breaks even is far lower. Exhibit 12 shows how the breakeven level has fluctuated over time for ATMF options on five-year forward ten-year swaps. As of the end of March, the five-year forward ten-year swap rate was 3.7%, among the lowest levels of the past decade. A buyer of this ATMF option would need this rate to rise to 4.5% to break even.

Another issue with swaption strategies is that there are nearly endless permutations of the options that can be transacted (in terms of maturity, term for the underlying swap, strike price, at-the-moneyness, foreign exchange, etc.) (Exhibit 13), and determining relative value or tracking pricing is not straightforward. In deciding the optimal hedge, investors should look at potential payoffs (as a percentage of upfront premium) and balance these against upfront costs, considering their view on interest rates. Bloomberg (or similar tools) can be used to calculate pricing and payoffs, as can external consultants as mentioned earlier. Shorter-dated options will provide much greater bang for the buck because their prices are much lower (e.g., a 1x10 ATMF payer swaption is currently about 50% of the upfront cost of a 5x10 ATMF payer), but there are some trade-offs. If the investor's view on interest rates is not realized within the given timeframe, short-dated options rapidly decline in price. Furthermore, strategies that involve more frequent option buying (e.g.,

continuously rolling into new 1x10 swaptions) create a behavioral risk that if the options are increasing in price, the investor postpones a purchase just at the wrong time.

While CMS caps, generally speaking, are easier to analyze and have fewer permutations, they offer less leverage to rising rates. The reason is that the payoff of a CMS cap (if it is in the money) equals:

> [actual swap rate at expiration - strike price] * the trade's notional amount

The payoff of an in-the-money swaption equals:

> [actual swap rate at execution - strike price] * the trade's notional amount * *length of the swap* (discounted appropriately)

Credit Risk. Purchase of an over-the-counter option from a counterparty creates credit risk, which will fluctuate depending on how in the money the option is. This risk can be mitigated in part by posting collateral between the two parties and by using multiple counterparties.

Liquidity Risk. Investors that purchase customized over-the-counter options from counterparties like investment banks should recognize that these options are less liquid than those purchased via an exchange. During periods of market dislocation, investors may find that when they attempt to monetize gains, mark-to-market profits on these options have been eroded by wide bid/ask spreads and the limited number of counterparties with which they can offset positions.

Recent History. Breakeven rates are much lower than they have been for much of the past two years, which should make profiting from higher rates easier. However, volatility is well above its historical average, and has only been at similar levels during the depths of the credit crisis in late 2008/early 2009. Were volatility to decline, this could further improve pricing, though predicting when this might happen is not easy as market dynamics have changed significantly in recent years. Historically, government-controlled mortgage agencies like Freddie Mac and Fannie Mae had a significant impact on pricing. These lenders typically bought options as rates rose, boosting volatility, as higher rates increased the risk of mortgage prepayment once rates came back down. Many believe the recent rise in interest rate volatility is more driven by market makers and institutional investors in interest rate derivatives than by mortgage agency activities.

4. Tail-Risk or Specialized Investment Vehicles

Many of the complications inherent in using derivatives also apply to this category, though some of the behavioral issues may be less relevant given the use of a manager, diversified vehicle, and/or commitment to funding the position for a set period of time. Of course, managers may fall victim to the same types of behavioral risks if their initial attempts to profit from rising rates are unsuccessful.

One argument in favor of using a vehicle may be that some managers are skilled at identifying which derivatives are less expensive on a relative basis across maturities and currencies. Pooled vehicles can also provide diversified hedges (through different tenors, currencies, option types, etc.) against higher rates, though some single-investor funds will also do this and can be more closely tailored to investor requirements. Some managers have devised strategies to try to overcome the forward curve's bias toward higher rates (e.g., by targeting longer-maturity forward curves where rates are downward sloping).

One consideration with this category is its relative newness given a three-decade bull market for bonds. While many of these managers have

previously been successful in different roles, none has long-term track records shorting interest rates. For example, some managers may have exhibited previous skill at managing bond portfolios or working as sell-side traders, but predicting when rates will rise and how is a different skill set entirely. Cost is another consideration—some of these options only charge a management fee, but others tack on hefty performance-related fees.

With respect to some of the hedge fund strategies established to capitalize on rising rates, investors should ensure they understand how the strategy will be executed and be prepared for potentially significant losses if rates do not move as expected. For example, some funds that shorted long-dated U.S. Treasuries suffered severe losses in 2011. Of course, to the extent that allocations were small or served as hedges, some investors may believe the insurance was worth the cost.

Investment Advice

Nominal interest rates eventually will rise—mathematically, some cannot go much lower. When and how this will occur is a separate matter entirely. Will central banks smoothly scale back QE efforts, or will longer-dated rates spike because foreign investors' demand for sovereign debt declines?

These questions hint at the challenges for investors that may be frustrated by the low carry on offer in some sovereign bond markets, or fearful about the effects of rising rates on their portfolio. There are no easy answers, and opportunity costs or outright costs in options premiums make many of the choices unattractive.

Cutting back on nominal bond duration is the easiest remedy; indeed, this has been our longstanding advice for many investors given the asymmetric risk/reward of buying bonds with historically low coupons. However, for investors choosing to decrease bond allocations, the investment of the proceeds matters as many investments are subject to decline during a rising rate environment. Putting some of the proceeds in safe cash investments may make the most sense as this would provide a stable source for liquidity needs in periods of inflation and deflation; however, this does come with an opportunity cost, and for investors with small allocations to bonds, it may not provide much protection.

Permanent allocations to assets like leveraged loan funds or rate-focused hedge funds could help cushion against higher rates, but there are two important caveats. One is that the type of rate increase matters—a gradual increase in rates will be far more benign for these assets than a sudden, significant shock that could imperil credit quality (both from a macro and debt affordability perspective). The other caveat is that such allocations could be a drag on portfolio performance, as could tail-risk funds whose bets do not pan out as expected.

Intuitively, we like the idea of using derivatives, as the payoffs can be asymmetric and there could be substantial benefits if rates rise as expected. However, interest rate volatility is expensive on a historical basis, and if the United States or other countries experience low rates for an extended period (i.e., a Japan-like scenario), it will seem even more so in retrospect (as recently purchased options plunge in value). A separate issue is that in recent years, the forward curve has tended to overestimate future interest rates, which makes profiting from derivatives based on this curve even more difficult. Finally, there are the issues of counterparty credit quality and liquidity, though there are tools that can help mitigate the former.

Investors that are favorably disposed to derivatives should start by learning more about trade

execution and monitoring markets like option pricing and interest rate volatility. Some investors will require time to get up to speed on different options and make sure systems and documents are in place for execution. Further, given the inherent complexity of these instruments, and the difficulty in determining relative valuations and which provide the best hedges for a given portfolio, investors should determine the types of consultants and counterparties with which they want to work going forward. While options are currently pricey, things can change rapidly, and if strike prices (interest rates) fall further or volatility moderates, this type of insurance may become attractive. ■

Exhibit 1

Ten-Year Government Bond Yields

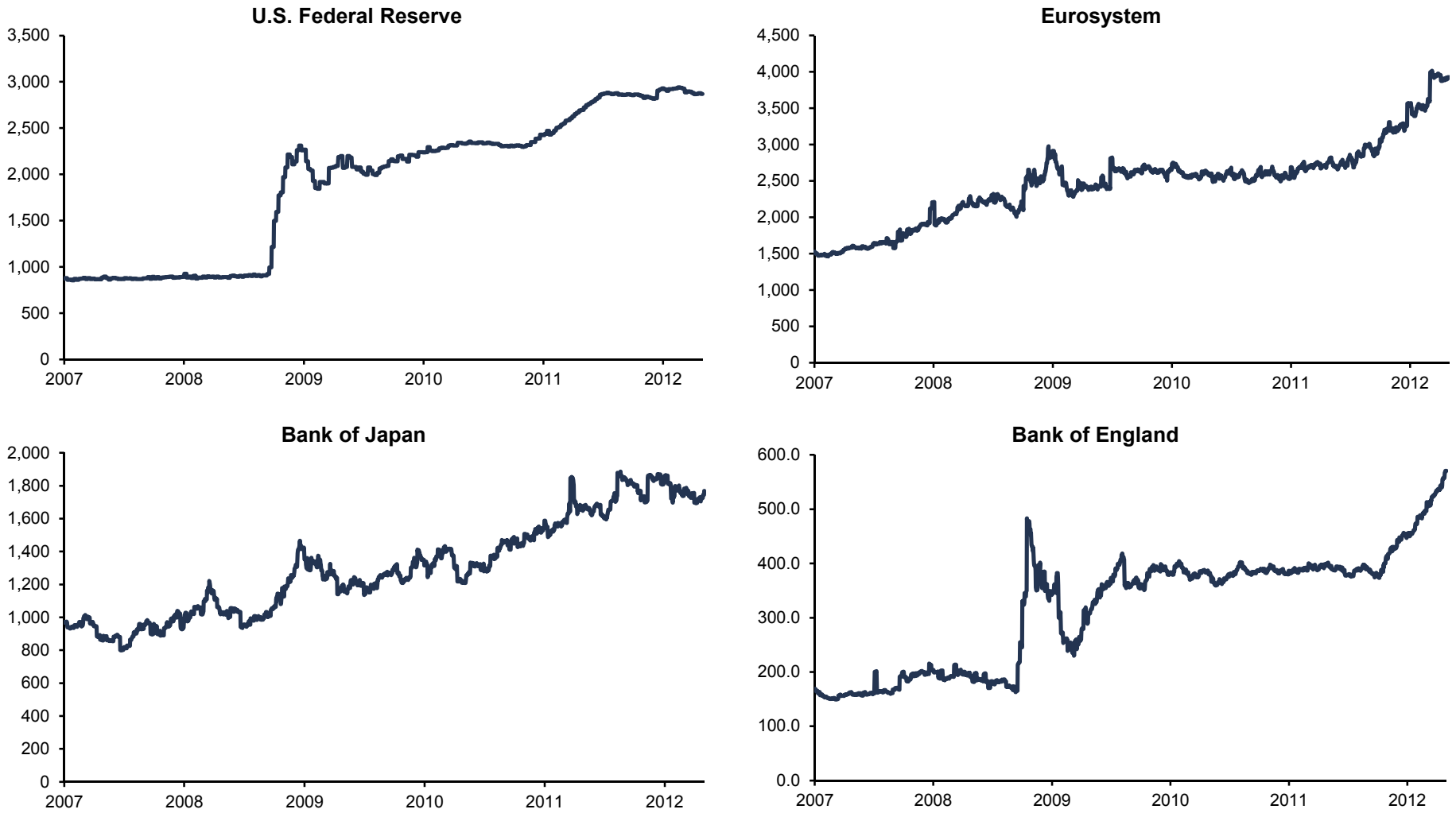
December 31, 1999 – April 30, 2012

Source: Thomson Reuters Datastream.
Note: All data are monthly.

Exhibit 2

Total Assets of Central Banks

January 1, 2007 – April 30, 2011 • U.S. Dollar (billions)

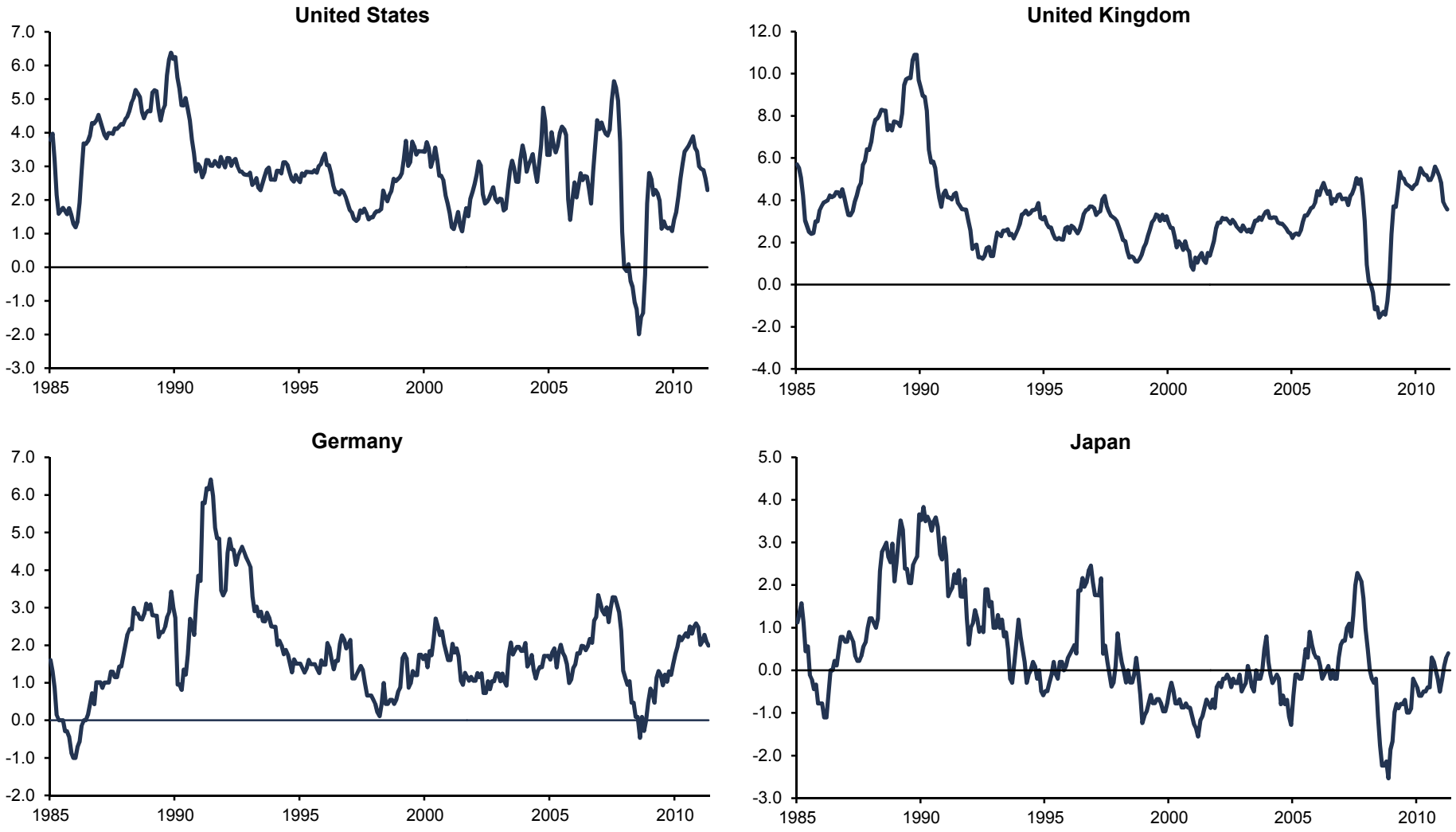


Sources: Bloomberg L.P. and Thomson Reuters Datastream.

Exhibit 3

Rolling 12-Month Percentage Change in Consumer Prices

December 31, 1985 – April 30, 2012 • Local Currency

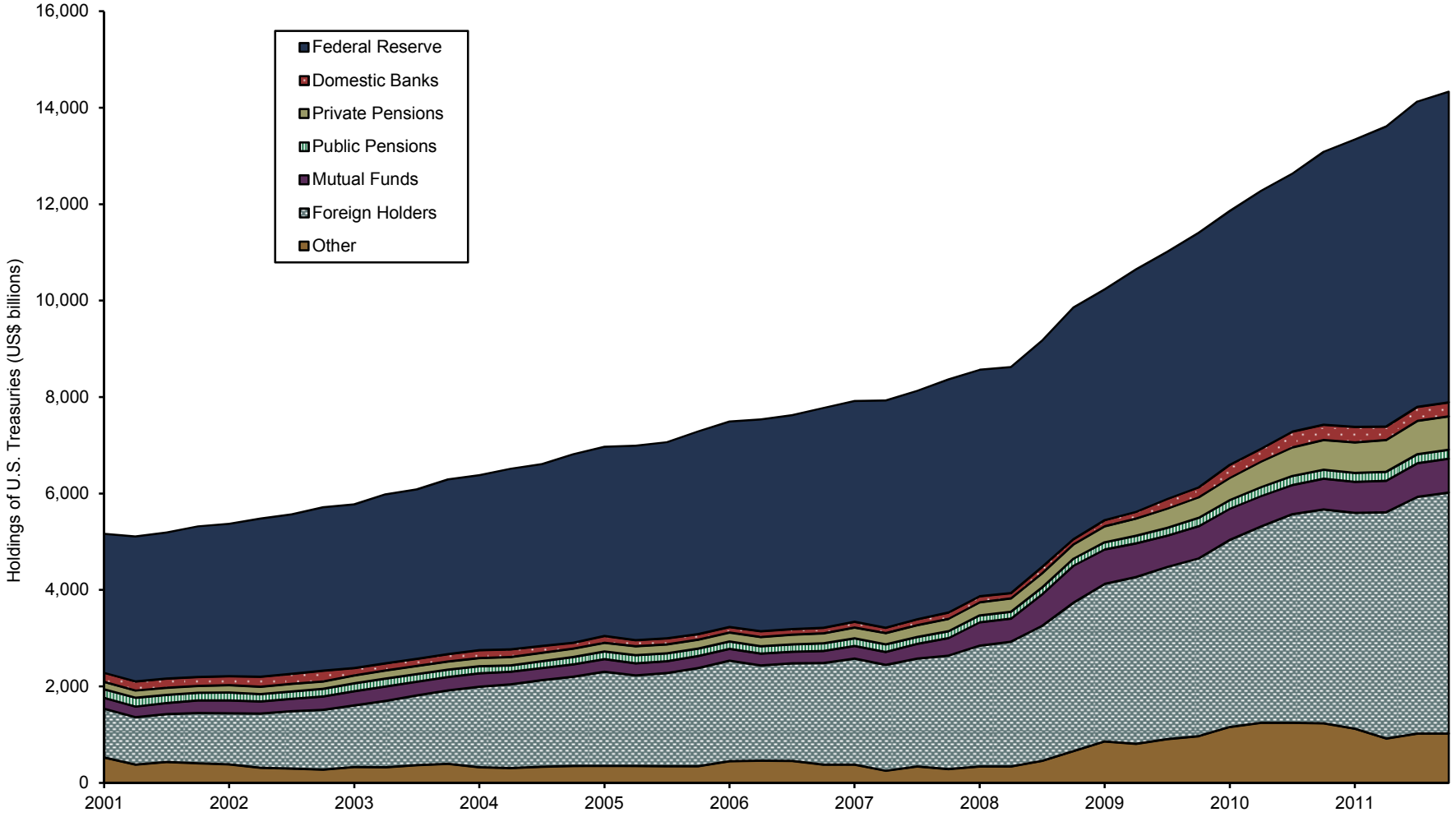


Source: Thomson Reuters Datastream.
Notes: Data represent the 12-month rolling percentage change. Data for the United Kingdom and Japan are through March 31, 2012.

Exhibit 4

Demand for U.S. Treasury Securities

First Quarter 2001 – Fourth Quarter 2011

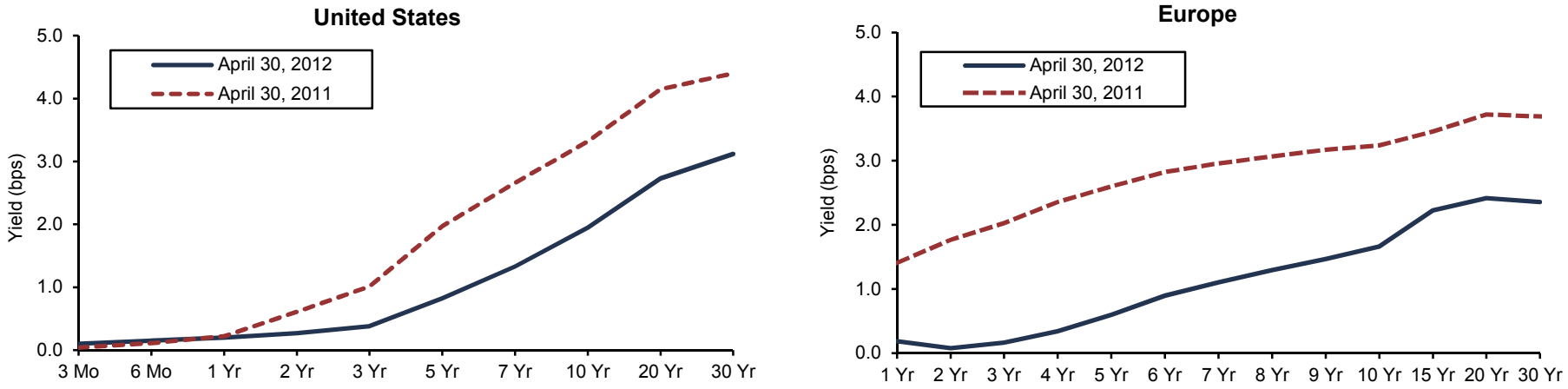


Source: U.S. Department of the Treasury.
Notes: Data are quarterly. Data for domestic banks include commercial banks, savings institutions, and credit unions. Data for mutual funds include money market mutual funds and closed-end investment companies. Data for other include individuals, government-sponsored enterprises, brokers and dealers, bank personal trusts and estates, corporate and non-corporate businesses, and other investors.

Exhibit 5

Treasury Yield Curves and Treasury Spread

Current and Previous Year Treasury Yield Curve



Spread Between Two-Year and 30-Year Treasuries

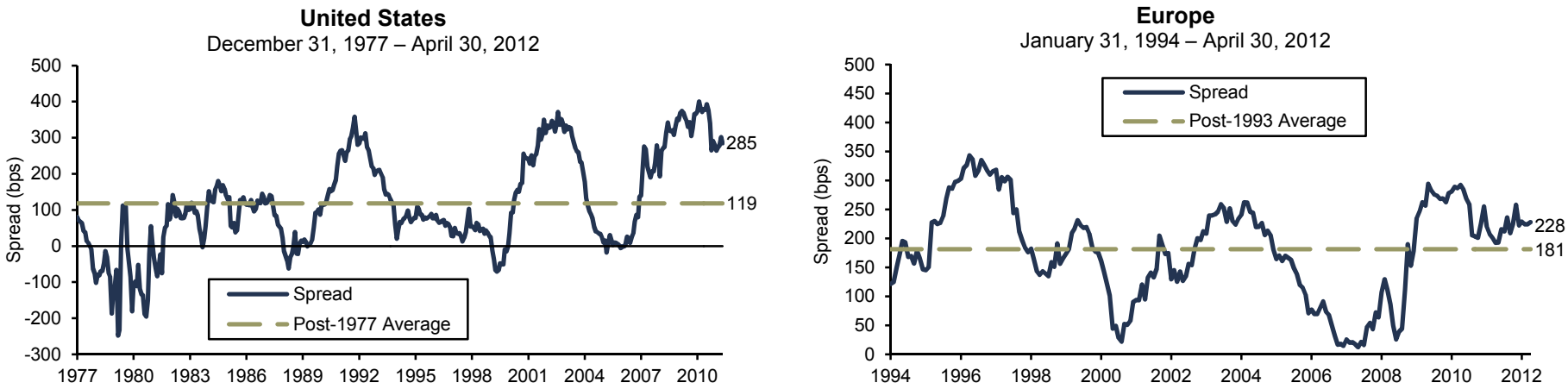
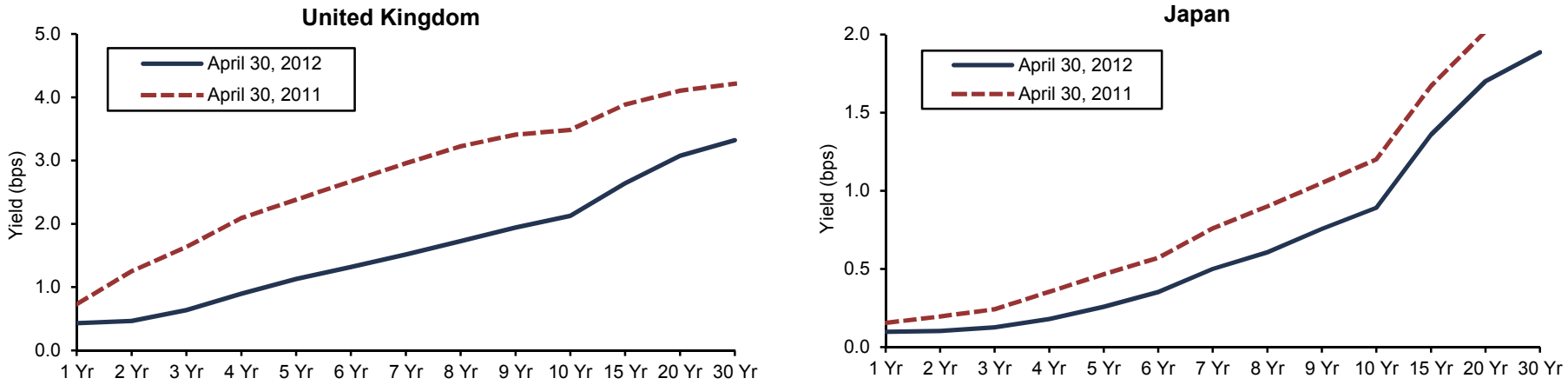


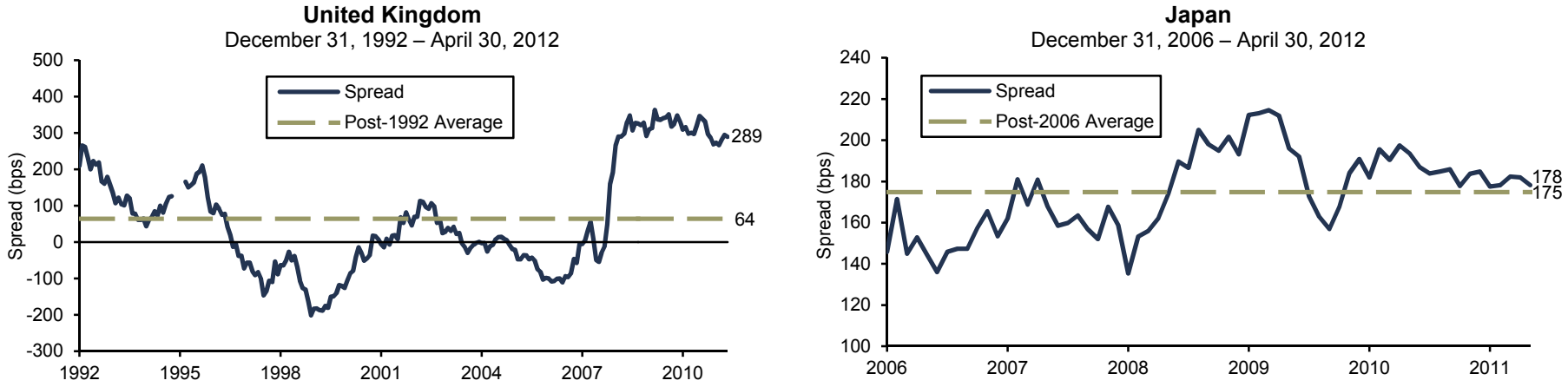
Exhibit 5 (continued)

Treasury Yield Curves and Treasury Spread

Current and Previous Year Treasury Yield Curve



Spread Between Two-Year and 30-Year Treasuries

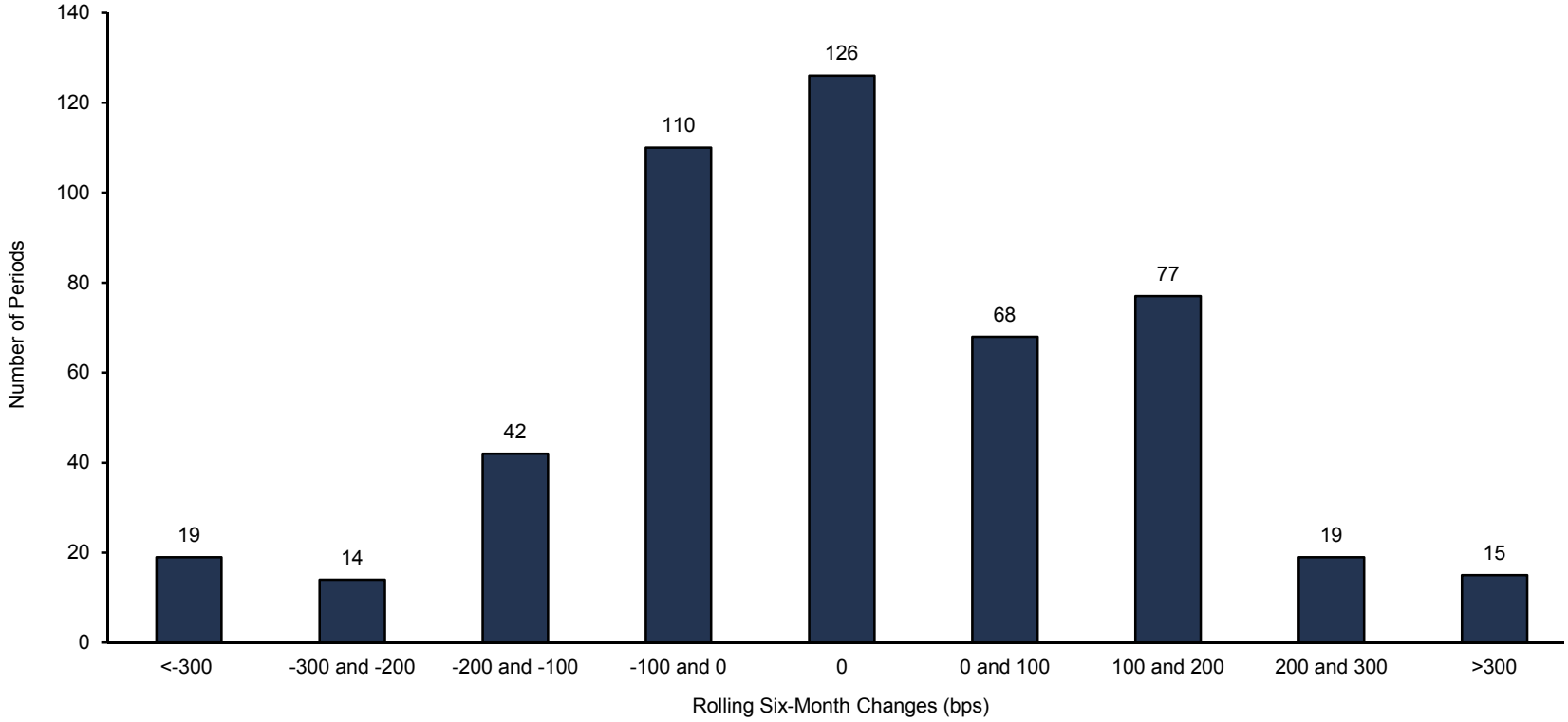


Sources: Bloomberg L.P. and Thomson Reuters Datastream.
Note: All data are monthly.

Exhibit 6

Changes in Fed Funds Rates and Impact on Bond Returns

July 31, 1971 – April 30, 2012



Average Return (Min/Max)

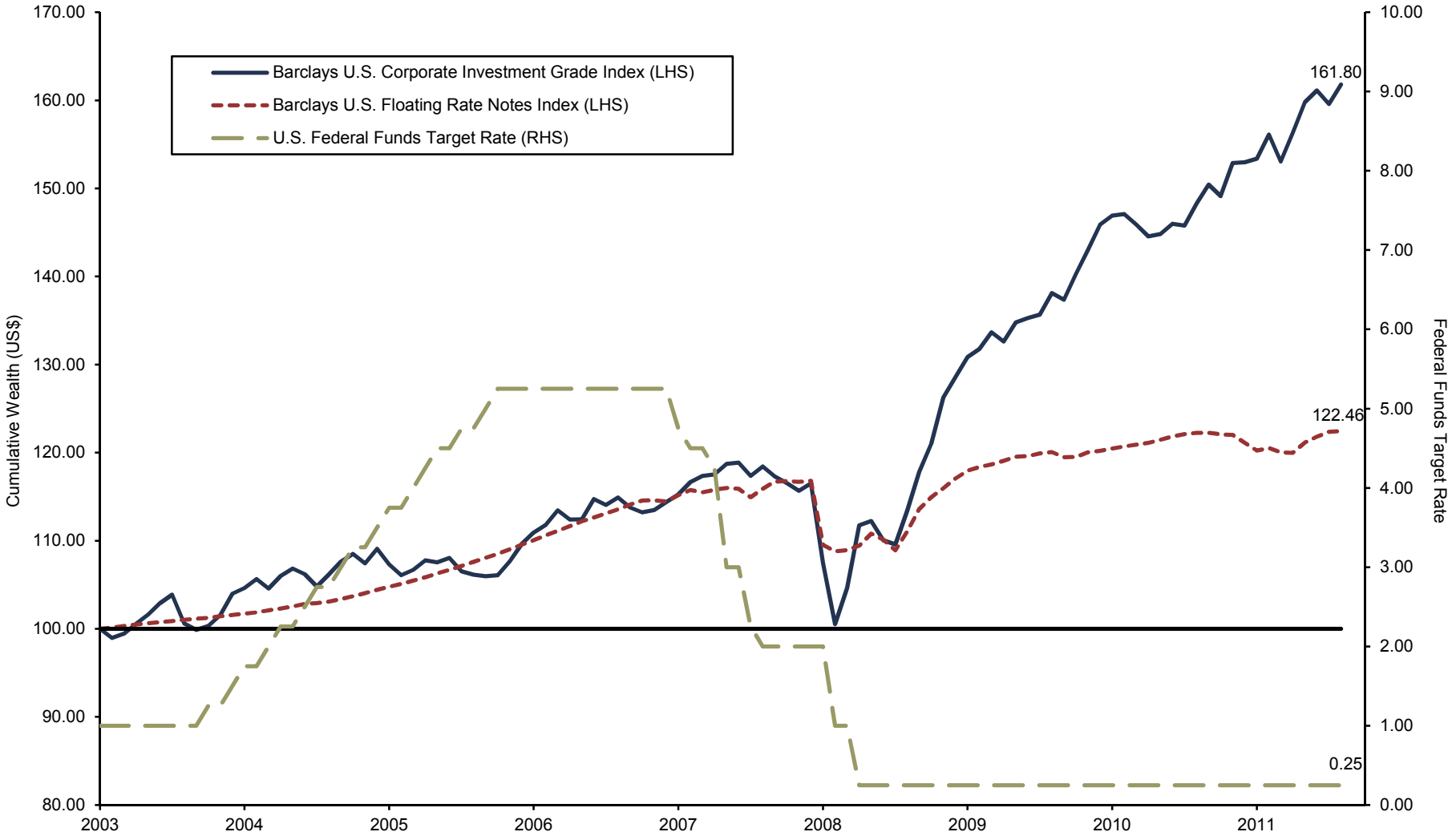
Five-Year Treasury	10.9 (-3.0/22.3)	7.6 (1.9/15.7)	6.8 (-2.0/15.3)	5.0 (-2.7/14.9)	3.7 (-2.8/13.2)	2.2 (-4.5/11.2)	0.9 (-4.6/5.8)	0.2 (-9.7/4.0)	-0.7 (-8.4/7.5)
Ten-Year Treasury	11.6 (-3.6/28.4)	7.6 (-0.5/19.5)	7.6 (-4.3/22.5)	5.6 (-5.0/25.0)	4.3 (-8.5/17.7)	1.6 (-8.8/15.3)	0.9 (-9.3/8.9)	-1.3 (-14.7/4.0)	-2.5 (-13.0/5.4)
B.C. U.S. Aggregate Index	10.2 (-1.4/24.1)	6.6 (0.0/17.1)	5.9 (0.0/16.9)	4.8 (-3.6/16.3)	3.9 (-1.6/11.1)	2.4 (-4.0/11.4)	1.3 (-4.5/7.0)	-0.6 (-12.5/3.8)	-1.6 (-11.5/4.9)
B.C. U.S. Treasury Index	10.8 (-0.9/20.6)	7.1 (1.5/15.3)	6.7 (-1.6/15.5)	5.0 (-2.9/17.3)	3.7 (-4.3/12.3)	2.3 (-4.5/11.2)	1.3 (-4.6/6.5)	0.8 (-7.0/3.6)	0.2 (-5.9/7.4)

Sources: Barclays, Global Financial Data, Inc., and Thomson Reuters Datastream.
Notes: Five- and ten-year Treasury represented by Global Financial Data, Inc., total return series from 1971 to May 1980 and Thomson Reuters Datastream total return series from June 1980 to the present. Data for Barclays U.S. Aggregate Bond Index begin January 1976. Data for Barclays U.S. Treasury Bond Index begin January 1973. All other data begin July 1971.

Exhibit 7

Cumulative Wealth of Investment-Grade and Floating-Rate Note Indices

September 30, 2003 – April 30, 2012

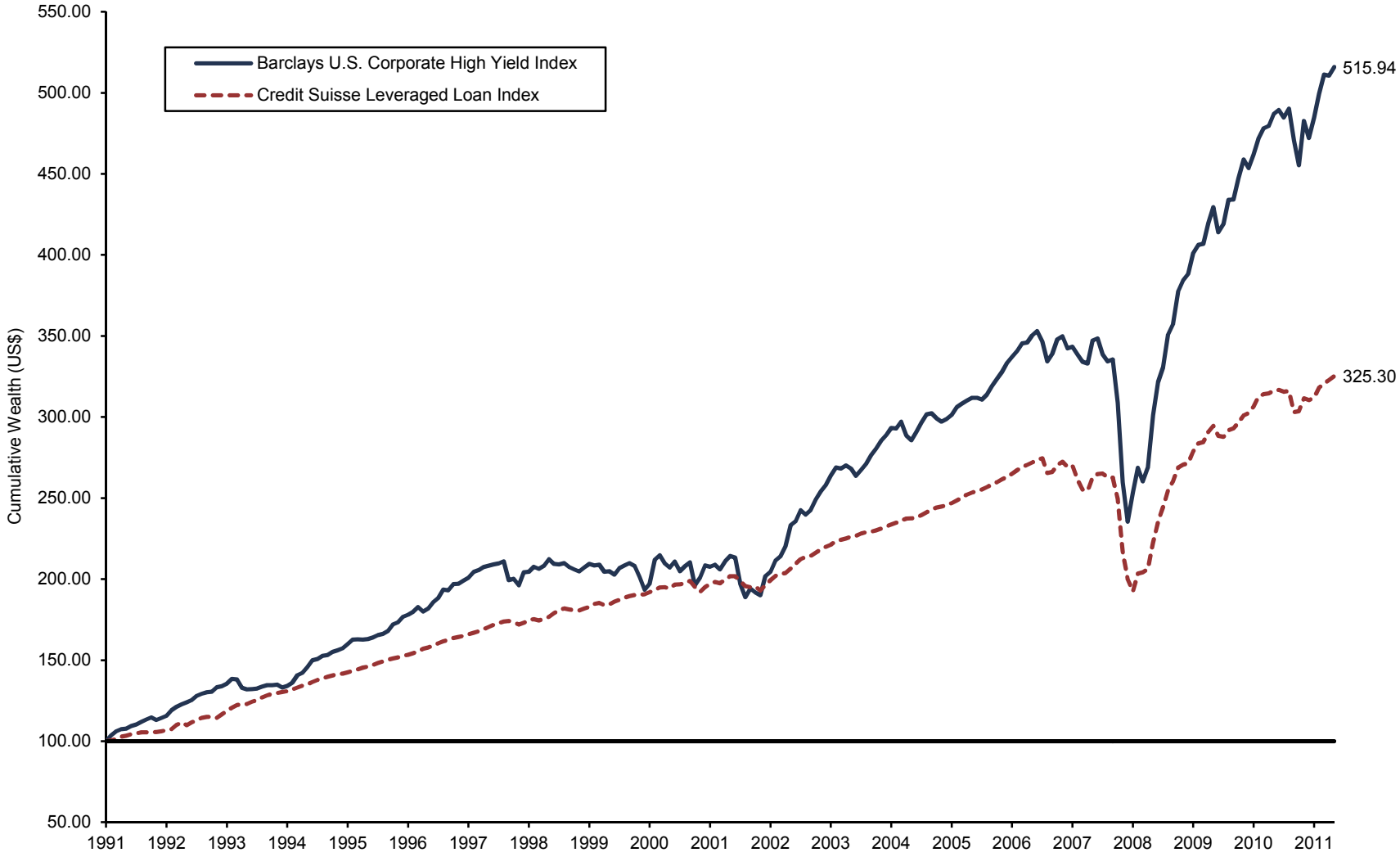


Sources: Barclays and Thomson Reuters Datastream.
Note: All data are monthly.

Exhibit 8

Cumulative Wealth of High Yield and Leveraged Loan Indices

September 30, 2003 – April 30, 2012

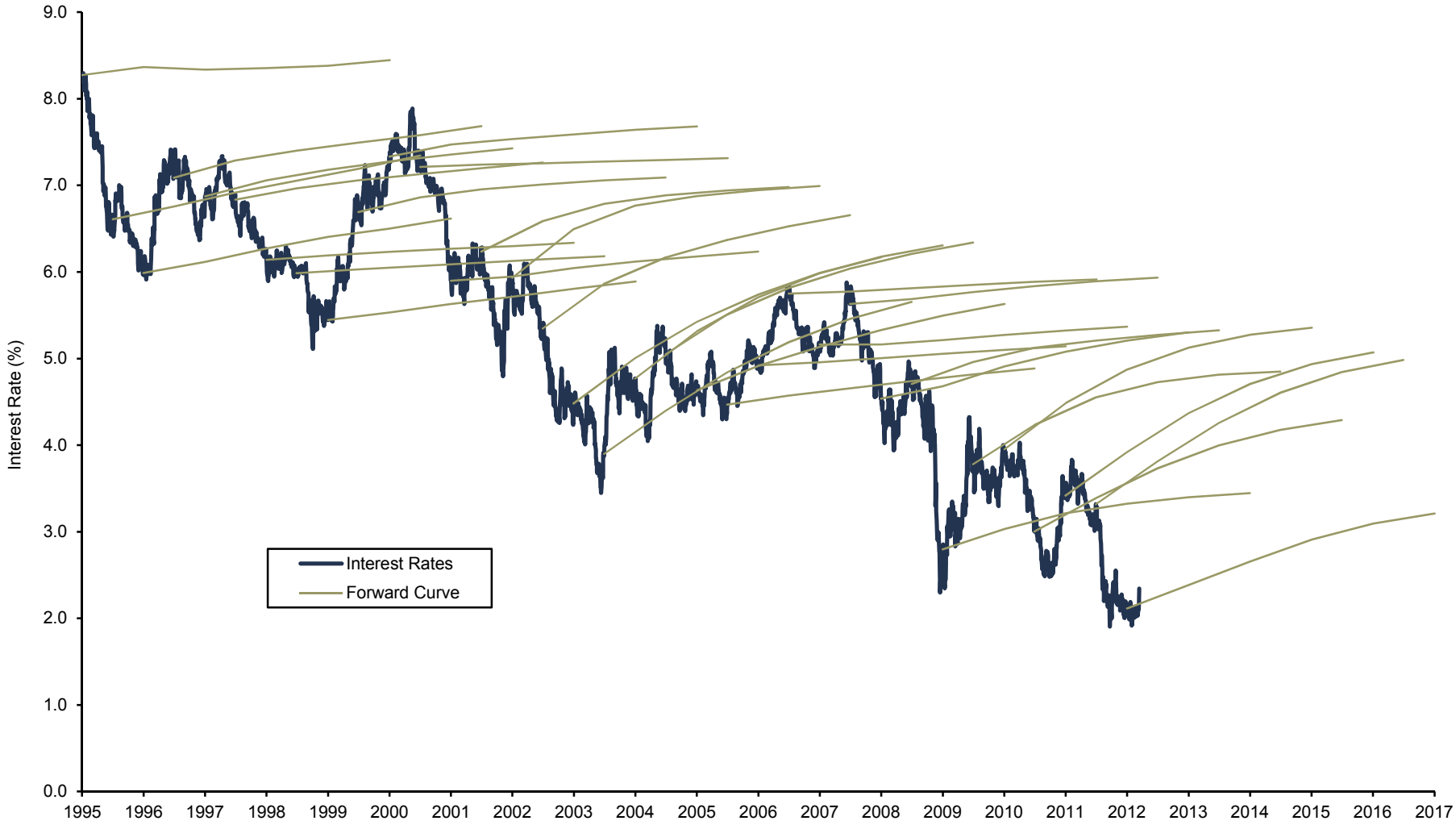


Sources: Barclays and Bloomberg L.P.
Note: All data are monthly.

Exhibit 9

Forward Curves and Historical Interest Rates

January 3, 1995 – March 15, 2012



Source: Goldman, Sachs & Co.
Notes: Thick line represents ten-year swap rate as of that date. Thin lines represent expected ten-year swap rate, as reflected by forward curve, one year, two years, three years, four years, and five years from that date.

Exhibit 10

Forward Spread Over Time

July 15, 2009 – April 26, 2012

Source: Bloomberg L.P.

Notes: The forward spread is defined as the spread between the current ten-year swap rate and the current five-year forward ten-year swap rate. Bloomberg data are not available from December 15, 2009, to January 5, 2010.

Exhibit 11

Implied Volatility on 5x10 U.S. Dollar Swaptions

July 15, 2009 – April 26, 2012

Source: Bloomberg L.P.

Exhibit 12

Five-Year Forward Ten-Year Swaption ATMF Breakeven

January 3, 2000 – March 31, 2012

Source: Goldman, Sachs & Co.
Note: All data are daily.

Exhibit 13

Ten-Year Swaption Matrix

As of March 30, 2012

Option Term	Forward	Receiver Swaption Premium: -400 bps	-300 bps	-200 bps	-100 bps	0 bps	Payer Swaption Premium: +100 bps	+200 bps	+300 bps	+400 bps	+500 bps
Two-Year	2.90%	0.00%	0.00%	0.02%	0.99%	4.70%	2.14%	0.94%	0.41%	0.18%	0.08%
Three-Year	3.26%	0.00%	0.00%	0.15%	1.77%	5.71%	3.09%	1.66%	0.90%	0.48%	0.26%
Five-Year	3.66%	0.00%	0.03%	0.96%	3.08%	6.89%	4.19%	2.57%	1.61%	1.02%	0.67%
Ten-Year	3.81%	0.00%	0.24%	1.97%	4.14%	7.43%	5.16%	3.55%	2.53%	1.83%	1.32%

Definitions

Swap: A derivative in which one party exchanges cash flows based on a fixed interest rate (the swap rate) for cash flows based on a three-month Libor.
Forward: The forward ten-year swap rate.
Option Premium: Expressed as a percentage of portfolio value.
Option Strike: Expressed as basis points relative to the forward swap rate.
Receiver Swaption: An option to receive the fixed leg of a swap (i.e., long receiver is long duration).
Payer Swaption: An option to pay the fixed leg of a swap (i.e., long payer is short duration).

Sources: Bloomberg L.P. and The Clifton Group.
Notes: Ten-year swap rate is 2.30%. Ten-year Treasury yield is 2.21%. Swap spread is 9 bps.