Long-term capital market return assumptions

2014 estimates and the thinking behind the numbers

J.P.Morgan
Asset Management

**J.P. MORGAN ASSET MANAGEMENT
LONG-TERM CAPITAL MARKET
RETURN ASSUMPTIONS**

The J.P. Morgan Asset Management *Long-term Capital Market Return Assumptions* are developed each year by our Capital Market Assumptions Committee, a multi-asset class team of senior investors from across the firm.

The Capital Market Assumptions Committee relies on the input and expertise of a range of portfolio managers and product specialists, striving to ensure that the analysis is consistent across asset classes. The final step in the process is a rigorous review of the proposed assumptions and their underlying rationale with the senior management of J.P. Morgan Asset Management.

The *Long-term Capital Market Return Assumptions* are used widely by institutional investors— including corporate pension plans, endowments, foundations, insurance companies, sovereigns and government-affiliated institutions—to ensure that investment policies and decisions are based on real-world, consistent views and can be tested under a variety of market scenarios.

ABOUT

**J.P. MORGAN
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J.P. Morgan Global Institutional Asset Management is a global leader in investment management, dedicated to creating a strategic advantage for institutions by connecting clients with J.P. Morgan experts globally. We are distinguished by our capital markets knowledge, global investment expertise, and the long-term partnerships we establish with our clients.

Our innovative strategies span equity, fixed income, real estate, private equity, hedge funds, infrastructure and asset allocation, building on the expertise of our 771 investment professionals based on the ground in over 35 countries.

J.P. Morgan Global Institutional is part of J.P. Morgan Asset Management, which is one of the largest asset and wealth managers in the world, with assets under supervision of USD 2.2 trillion and assets under management of USD 1.5 trillion (as of 30 September 2013).

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FOREWORD

An air of serenity descended over the world economy and markets during 2013. Policy priorities began to shift towards generating economic growth and equity markets responded strongly. Yet, despite this calmer tone, hazards still lurk, with the recent U.S. debt ceiling stand-off a hint of what could still go wrong.

Against this complex market backdrop, our *Long-term Capital Market Return Assumptions* are back for the eighteenth year. Put together by an experienced team that blends the best thinking of investment professionals from across J.P. Morgan Asset Management, the Assumptions aim to provide institutional investors with the guidance they need to make more informed long-term strategic asset allocation decisions. The Assumptions Committee includes some of the firm's most senior investment professionals, with representatives from the Asset Management Solutions Group, the Endowments & Foundations Group, the Strategy Team and the Private Bank.

This is the third year that our *Long-term Capital Market Return Assumptions* have been delivered in an expanded report format, drawing together 10- to 15-year assumptions for returns, volatilities and correlations plus the macro thinking behind the forecasts. Assessing the historical record of our Assumptions over the unprecedented events of the last decade, this year's edition also includes analysis demonstrating that the Assumptions have stood the test of time.

The *Long-term Capital Market Return Assumptions* benefit from a blend of qualitative and quantitative analysis, but rely ultimately on judgement. They provide investors with the output of an established process, covering approximately 50 asset classes. We have strived to make this report consistent, cohesive and comprehensive in the hope that our readers will find it an indispensible and vital source of information in an ever-changing world.

This year's main theme is a story of normalisation—or the journey towards normalisation—in the world economy and markets. We assess whether the conditions are finally in place for markets to normalise after the dislocation of the financial crisis of 2008-09, and develop a simple equity ranking framework to help identify attractive markets for the coming decade. In addition, we have enhanced the layout of our website, improving accessibility and enhancing the presentation of the data.

We would like to thank the many colleagues throughout the organisation who have contributed to the output and/or helped in the production of this document.

We very much hope that you will find the 2014 edition of the *Long-term Capital Market Return Assumptions* useful and insightful and look forward to your suggestions for further improvement.

David Shairp   Anthony Werley   Michael Feser, CFA

On the road back to normality

by **David Shairp,** *Global Strategist and Portfolio Manager, Asset Management Solutions Group*
and **Anthony Werley,** *Chief Portfolio Strategist, Endowments & Foundations Group*

In brief

An air of normality is gradually returning to markets and their participants. In some ways, little has changed, with several of the challenges highlighted in these pages over the past two years still very much in play. Yet in others, there are signs of a turning point, with economic growth and market returns stabilising as the world economy continues to return to normality.

In this year's *Long-term Capital Market Return Assumptions* paper, we assess the historical record of our assumptions over the last decade. Our analysis shows that the assumptions have stood the test of time during an unprecedented period.

Our long-term assumptions at the broad asset class level include:

- Fixed income returns are likely to be hurt as yields eventually rise towards higher equilibrium levels—though this damage has been tempered due to higher starting yields than a year ago.

- Real equity returns will be respectable, broadly in line with prior year assumptions. Emerging markets should remain the top performers, but prospects have been downgraded.

- Return opportunities in alternatives remain attractive, but with wide disparity across managers.

Looking back: The importance of forward-looking assumptions

The importance of forward-looking assumptions cannot be understated. **Exhibit 1** illustrates the error of applying historical average market returns as a proxy for future results. The magnitude of difference between the historical and the actual results reinforces the adage that "past is not necessarily prologue." It goes without saying that interpreting the exact trail of historical market results as representative of future outcomes can have a material impact on expectations of portfolio results and on the ability of institutions to meet their goals and objectives.

Considering the impact that asset class risk, return and correlations have in constructing an accurate assessment of forward-looking efficient frontiers, policy benchmarks and strategic allocations, considerable resources have been dedicated to the task of producing J.P. Morgan's annual assessment of the forward 10- to 15-year outlook—our proxy for two economic cycles. For 18 years, J.P. Morgan has been generating the *Long-term Capital Market Return Assumptions* on an annual basis. Over that time period, our assumptions have attracted considerable attention and application among our clients and consultants.

EXHIBIT 1: PAST IS NOT NECESSARILY PROLOGUE—COMPARING LONG-TERM HISTORICAL AVERAGE EXPECTATIONS WITH 10-YEAR ACTUAL RESULTS (1974-2003 VS. 2004-2013)
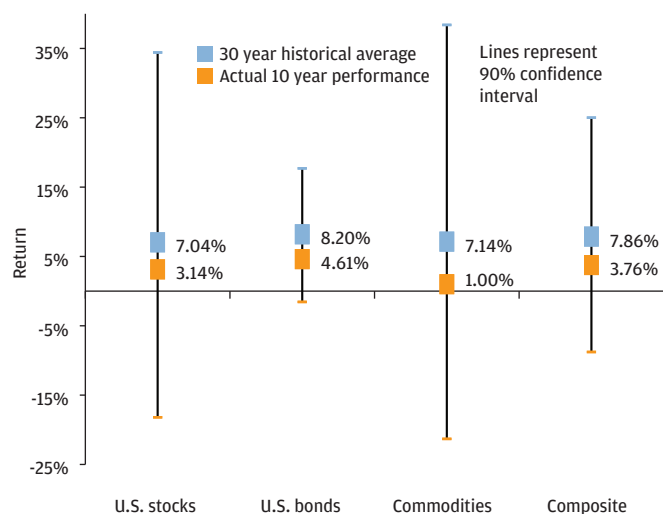
Source: J.P. Morgan. 30-year historical average from January 1974–December 2003; actual 10-year performance from January 2004–September 2013.

Starting in 2004, the asset class assumptions were expanded to include a more comprehensive set of sub-asset classes and strategies, such as Asia ex Japan equity, and alternative strategies, such as diversified hedge funds—all of which are essential in sophisticated portfolio building. With the 2014 *Long-term Capital Market Return Assumptions*, we now have the ability to look back over the minimum estimation time frame with a more robust set of assumptions and examine the projection record broadly, to answer the question, are we any good at this exercise?

Looking back over the past 10 years of financial market history, this estimation time period was anything but normal, including as it did a recovery from a stock market crash and recession, a credit bubble, a second stock market crash and subsequent great recession, with an ongoing global deleveraging that is still in its early to mid stages in many parts of the world. With the "unknown unknowns" dominating the past 10-year assessments, hitting the target rather than hitting the bull's-eye might seem an appropriate criteria for judging the results. In any estimation, we believe our bottom-up fundamental assessments, coupled with our top-down vision of what's different this time, capture the dynamic of reversion to mean and the unique aspects of each forward economic cycle reasonably well.

As a means of testing the value of the J.P. Morgan 10-year projections for 2004 through to September 2013, we employ a similar portfolio-level exercise. Using a more granular, sophisticated asset allocation, the J.P. Morgan projections are pitted against the actual historical results[1] (**Exhibit 2**). The results are impressive for three main reasons:

- At the end of the 10-year period, the portfolio's total wealth value projected by J.P. Morgan's *Long-term Capital Market Return Assumptions* differed by approximately 8% from the performance of a portfolio using actual benchmark results. This margin of error represents a thirty-eighth percentile rank within a non-normal distribution framework (with a fiftieth percentile rank being a "perfect" score).

[1] Balanced portfolio constructed with allocation of 45% world equity, 30% core global bonds, 10% hedge funds, 5% REITs and 10% private equity.

EXHIBIT 2: J.P. MORGAN LONG-TERM CAPITAL MARKET RETURN ASSUMPTIONS VS. ACTUAL MARKET RESULTS IN THE CONTEXT OF A BALANCED PORTFOLIO*

Range of projected asset values from the 2004 Long-term Capital Market Return Assumptions and realised returns

USD, millions

▲ Historical performance

■ Allocation

■ 95th percentile*

Most probable asset values* ▢ 50th percentile*

5th percentile*

● Expected tail loss*

CMA projection focal point

Historical portfolio performance

90% of projected allocation values

Projected extreme loss potential

	World equity	Hedge funds	Private equity	REITs	Bonds	Allocation
95th percentile	433.1	265.6	978.0	369.7	183.4	322.7
50th percentile	217.7	176.9	253.1	207.3	155.5	204.2
Historical performance	181.8	135.3	335.5	228.8	153.9	187.8
5th percentile	109.4	117.9	65.5	116.2	131.8	129.3
Expected tail loss	92.9	106.8	48.4	101.1	126.5	115.7

	World equity	Hedge funds	Private equity	REITs	Bonds	Allocation
Asset allocation	45%	10%	10%	5%	30%	100%

Source: J.P. Morgan. *Notes: (1) This is a projection used for illustrative purposes only and does not represent investment in any particular vehicle. References to future asset values are not promises or even estimates of actual returns you may experience. Past performance is no guarantee of future results. It is not possible to invest directly in an index. (2) "Most probable asset values," denoted by the darkly shaded area, indicates the range in and around the fiftieth percentile. The fiftieth percentile indicates the middle wealth value of the entire range of probable asset values. The ninety-fifth percentile wealth value indicates that 95% of the probable asset values will be equal to or below that number; the fifth percentile wealth value indicates that 5% of the probable asset values will be equal to or below that number. Another way of looking at it is 90% of the probable asset values will be between those two figures. ETL is an assessment of the average loss as a result of a tail event (tail = worst 5% of outcomes). (3) Historical allocation of 45% world equity, 10% hedge funds, 10% private equity, 5% REITs, 30% global aggregate bonds. Asset allocation assumes annual rebalancing, no taxes and no cash flows. All returns are based on index data and include no manager alpha. Indices used: Barclays Capital Global Aggregate Bond Index, MSCI Developed World Index, HFRI Fund of Funds Diversified Index, Venture Economics U.S. Buyouts Index (proxied with S&P 500 from April-September 2013), NAREIT Equity REITs Index. The 2013 historical return is proxied with the return from January to September. The projections include manager fees but not transaction costs associated with annual rebalancing.

- The projected portfolio results never fell out of a 90% confidence interval (an interval or range including 90% of all portfolio outcomes that are statistically possible using the J.P. Morgan risk, return and correlation inputs) even during the multiple market and strategy declines of 2008. There was, however, a positive four-year compounding period from 2004 through to 2007 that buffered the wealth value decline of the 2008 portfolio decline.

- The greater the volatility of the underlying asset classes in the portfolio, the greater the possibility and degree of missing the mark vs. the ultimate market performance. However, no asset class or strategy projection had no lower than a fourteenth percentile rank within the empirical distribution (with a fiftieth percentile rank being a "perfect" score).

We therefore believe that our process has been a source of stability and value add for the modelling of portfolios and allocation inputs, even when presented with the testing conditions over the past decade.

Looking forward: Getting back to normal?

At the time of writing, the global economy appears to be in a more settled environment, with evidence accruing of a quickening in global activity, signs of ongoing supportive policies by central banks, and asset class valuations that favour risk taking.

Given that this more settled environment comes hard on the heels of a government shutdown in the world's largest economy (which threatened a possible debt default), as well as concerns about the world's second-biggest economy (China), it is a relief that relative calm has been restored so quickly.

Yet despite the better cyclical outlook, ongoing structural concerns remain that are likely to affect the assumptions made over the investment horizon of this document. As we wrote a year ago, serious macroeconomic problems are the background to the present situation; on both sides of the Atlantic, there are unusually high levels of unemployment and critical problems with national budgets. Policy responses have brought interest rates to record lows, yet there has been little economic growth. Political gridlock has threatened to make matters worse, with the U.S. in danger of falling off a fiscal cliff and the eurozone in danger of disintegrating.

Our approach has been to set aside the possible consequences of extreme political intransigence in the U.S.—an assumption that has been tested almost to destruction over the final months of 2013. Nor do we allow for the demise of the euro, as might be expected should the member countries of the European Union fail to agree on the measures necessary to make the eurozone a feasible currency area.

Instead, we have considered a central scenario that we believe to be the most pertinent for financial markets over the next 10 years. In particular, we consider the consequences of the following issues: a prolonged period of public sector deleveraging in the U.S. and in Europe; and the question of global rebalancing, as well as inflation.

Deleveraging and rebalancing: Converging towards the longer term?

Public sector deleveraging remains an ongoing burden for the world economy, despite the extent of the fiscal adjustment that has already occurred. In the past year, public debt levels have risen further in most developed countries, adding to the burden of adjustment over the next 10-to-15 years.

Meanwhile, the October 2013 edition of the IMF's Fiscal Trends shows that sizeable fiscal tightening is still required over the next seven years to stabilise and reduce debt ratios (**Exhibit 3**). For example, in the case of the U.S., the five percentage point tightening of fiscal policy required over a seven-year period is sizeable, especially for an economy that has seen trend real GDP growth of just 1.2% per annum over the 2009-2013 period.

Nevertheless, it should be noted that some of this growth disappointment has been due to tighter fiscal policy as a result of the sequester in the U.S. Meanwhile, it should be noted that the burden of fiscal adjustment has reduced for several eurozone countries.

EXHIBIT 3: REQUIRED FISCAL TIGHTENING TO MEET LONG-TERM DEBT TARGETS*

Fiscal adjustment as a % of nominal GDP*
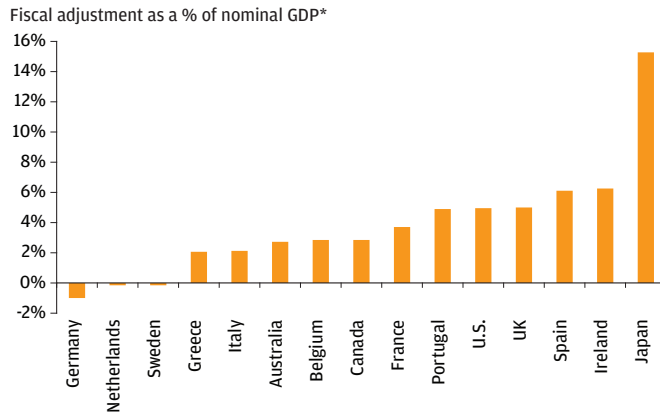
Source: IMF Fiscal Monitor, October 2013. *Note: The required fiscal adjustment is measured as the cumulative change in the cyclically-adjusted primary budget balance between 2013 and 2020 needed to bring the debt ratio down to 60% in 2030, or to stabilise debt at the end-2013 level by 2030.

Interestingly (and conveniently), the IMF estimates that debt ratios will peak and start to decline relative to GDP in many OECD countries over the next five years.

This more optimistic prognosis is a welcome development, but should be tempered by two observations. First, the current more optimistic backdrop has benefited from a cyclical upturn in several economies, although the eurozone economy was just climbing out of recession in the second half of 2013. It is therefore entirely possible that the next cyclical downturn in the global economy could coincide with renewed concerns about fiscal sustainability, especially if doubts grow about the efficacy of unorthodox monetary policies.

Second, there is growing evidence of "adjustment fatigue," to use the IMF's own description. This has been very apparent in Europe, but also in the U.S. More pertinently, this fatigue is likely to test the electoral patience of voters in countries that are continuing to soldier on with fiscal austerity. Austerity over the past five years in Europe has coincided with political upheaval and the rise of non-traditional parties on both the extreme right and left of the political spectrum (for example, Golden Dawn in Greece) who are opposed to the eurozone and the imposition of continued austerity.

The next five years are set to bring elections in several countries across the eurozone, which could lead to large political changes should the fiscal arithmetic begin to worsen once more. The IMF in its latest Fiscal Monitor hints that taxation policies will play a greater role over the next few years.

There are five possible outcomes (or a combination thereof) to fiscal deleveraging over the next 10 to 15 years: growth, repayment, inflation, restructuring and outright default. While the current window of accelerating activity holds out the hope that growth strategies can be followed to pay down debt ratios, the reality remains that several economies suffer from low rates of underlying nominal GDP growth and are thus vulnerable to any upturn in interest rates. A sustained upturn in bond yields will bring a deterioration in fiscal solvency statistics, risking a reversal of the recent progress that has been made. While the environment looks brighter, it is still probable that the next downturn will bring more unorthodox methods to deal with the pressures of deleveraging in the latter half of the horizon of our *Long-term Capital Market Return Assumptions* (**Exhibit 4**).

EXHIBIT 4: DEBT RESOLUTION SCENARIOS

	Expected likelihood of outcome*	
Scenario	0-5 years	5-15 years
(1) Grow it away—Growth strategy	●●◆	●
(2) Pay it off—Fiscal retrenchment	●●●◆	●
(3) Inflation tax—Monetisation	●●●	●●●
(4) Default-lite—Debt restructuring	●●●	●●●
(5) Default-heavy—Full scale repudiation	●	●●

Source: J.P. Morgan; assessments as of 30 September 2013.

* Note: Table shows judgments made regarding the relative likelihood of potential outcomes over the next 0-5 and 5-15 years from unlikely ● to more likely ●●●. ● denotes that expectations have increased from a year ago; ◆ denotes that expectations have reduced from a year ago

Global rebalancing

An optimistic outlook for the next 10 to 15 years requires a rebalancing of activity globally, with increased demand growth in the nations that run current account surpluses offsetting the drag on demand in the deficit countries. In the deficit economies, trend rates of growth will depend on the extent to which incremental private sector demand can offset the drag from the public sector.

The latest forecasts by the IMF throw into doubt the prospects for successful rebalancing. The projections suggest that the aggregate savings ratio in the developed world will rise relative to GDP through to 2018 (the end of the forecast horizon), while the output gap is projected to remain sizeable. However, the so-called Eurasian savings surplus is expected to gradually decline during the next five years to below the long-term average. This aggregate comprises private sector savings balances in the OECD and current account balances in East Asia (**Exhibit 5**).

At a country level, there are several examples where rebalancing is needed:

- China needs to bring about a transfer of resources from its corporate sector to the household sector. This will require liberalisation of interest rates and perhaps the relaxation of outward capital flows, to allow households to seek better returns on their savings. It is worth noting that Chinese national savings amount to USD 4.2 trillion, compared to USD 2.7 trillion for the U.S. A flow of Chinese savings into the global markets could potentially have a huge impact on the global cost of capital, thereby helping to ensure smooth rebalancing.

- Japan needs to reduce corporate saving to encourage more rapid private consumption.

- The U.S. and UK need to rebalance income shares from the corporate to the household sectors.

- The eurozone is suffering from excessive levels of savings in Germany, judging by Germany's large and stable current account surplus. This has imposed a deflationary adjustment on the periphery of the eurozone, with the result that the entire eurozone is running the largest current account surplus in the history of the single currency, according to the IMF.

EXHIBIT 5: THE GLOBAL SAVINGS GLUT—NORMALISING*
% of global GDP
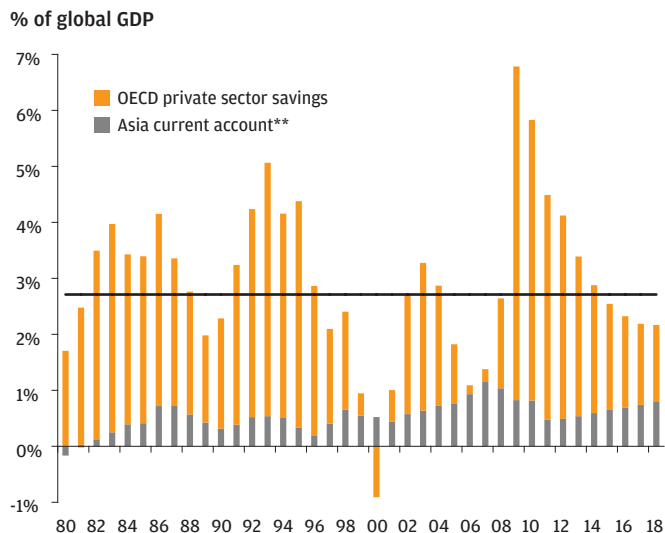
Source: IMF World Economic Outlook (October 2013), Lombard Street Research. *Note: Based on an approach by Charles Dumas, "Globalisation Fractures: How Major Nations' Interests Are Now In Conflict," (Profile Books, 2010). ** China, Japan, Korea, Taiwan and Hong Kong.

Inflation

Inflation is not seen as much of an issue over the medium term. Our *Long-term Capital Market Return Assumptions*, unusually, have not changed the inflation rates projected over the next 10 to 15 years in either developed or emerging markets. Rates of spare capacity are expected to remain large in the first five years of the outlook, though with some reduction thereafter. The eventual restoration of fully functioning credit mechanisms is also expected to improve growth and demand.

In the meantime, our inflation warning framework continues to signal limited inflation risk over the medium term (**Exhibit 6**).

Economic assumptions and asset class implications

Real GDP expectations for the U.S. are raised by 0.25% per annum to 2.5%, while assumptions for Europe, the UK and Japan remain unchanged. Emerging markets, however, are likely to be the source of growth and inflation (as explained in the Macroeconomic Assumptions article on page 40 of this paper).

Fixed income

Policy rates are set to remain low for at least another two-to-three years, before commencing their long and arduous journey back to equilibrium levels. Bond yields are likely to rise significantly and more quickly as well as from today's levels, although not for a while.

Corporate bonds will be supported by limited excess credit build up, strong investor demand for income and yield, and narrower credit quality differentials relative to government debt. Overall fixed income returns are dampened by the rise in yields towards the expected higher equilibrium levels in the latter part of our forecast horizon (see **Exhibit 7A**).

Equities

Equity returns are likely to benefit from higher dividend yields, while we expect a mixed outlook for valuations following continued strong performance in 2013. We see no re-rating in the U.S., but look for some contribution from valuations in the UK and Europe, while we see a small drag on valuations in Japan following the large market gains of 2013. We continue to look for western companies, especially those in Europe, to benefit from fast-growing markets overseas. Emerging markets are expected to remain the top performers, but we have reduced our assumed total return expectations.

Nominal U.S. equity returns of 7.50% equate to average annual real returns of 5.25%, after subtracting our core inflation estimate. This is respectable, but below the long-term average of 6.3% per annum (see **Exhibit 7B**).

Alternatives

Alternative strategy returns for 2014 are generally lower, reflecting primarily above average performance in 2013 for real estate, a lower outlook for the core market risks (or betas) of a given strategy of hedge funds and, in the case of commodities, a new supply/demand dynamic that is moving towards more of a long-term equilibrium. We maintain our stance that successful alternative investing is about manager selection/due diligence rather than the modest median manager expectations modelled for our long-term risk/return assumptions.

Private equity returns should continue to maintain a small premium to large capitalisation public investing despite a number of positive and negative forces at play over the evaluation time frame. Hedge fund returns are marked lower going forward, capturing the underlying market exposures that dominate each strategy's risk profile (see **Exhibit 7C**).

Real estate and infrastructure returns, after an above average year in 2013, are expected to be lower in the case of core assets, while extended real asset risk, such as value added, should see promising returns as the real estate cycle matures and the global economy continues to grow.

We have materially reduced our commodity outlook to capture the significant rise in supply that has been building over the past 10 years. Reduced global demand, particularly from China, and a spike in supply across much of the commodity spectrum has produced a volatile and unexciting return outlook although still technically within the realm of a supercycle as real returns are still expected (see **Exhibit 7D**).

EXHIBIT 6: INFLATION—EARLY WARNING INDICATORS ARE MAINLY ON GREEN*

Indicator	Warning system status			Current reading	Most recent red
	Green	Yellow	Red		
Five-year five-year forward inflation breakeven (%)	Below 3.0	3.0–3.3	Above 3.3	2.6	None since inception (1999)
Long-term consumer inflation expectations (%)	Below 3.2	3.2–3.6	Above 3.6	2.8	June 1993
Employment Cost Index (% year on year)	Below 3.5	3.5–4.25	Above 4.25	1.9	Fourth quarter 2001
ISM non manufacturing survey prices component (six-month change)	Dropping	Up less than 20	Up more than 20	Up 1.3	None since inception (1997)
CRB commodity price index (% year on year, 12-month moving average)	Up less than 20	20–40	More than 40	-4.3	July 1974
Baltic Dry Index (year on year index change)	Less than 3,000	3,000–5,000	More than 5,000	+500	June 2008

Source: J.P. Morgan, MacData. *Judgements based on data available as of 31 October 2013.

Currencies

Our exchange rate assumptions are derived by drawing on a broader set of widely accepted theoretical concepts such as absolute and relative purchasing power parity (PPP), productivity differentials and the terms of trade, to develop assumptions that reflect the future fair value of a currency exchange rate. Towards the end of 2013, many of the major currencies, including the U.S. dollar, the euro and sterling, were trading close to long-term fair value, with only the Japanese yen looking significantly undervalued. Our currency assumptions suggest long-term appreciation of the yen, with a small depreciation for the euro and sterling.

Emerging markets

In our view, emerging markets are currently more complex than a straightforward play on global growth. From a macro perspective, the eight mainstream emerging markets seem to have ar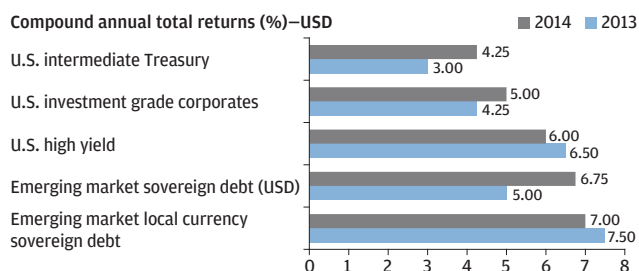rived at an inflection point after a decade of rapid development. As these countries place a greater emphasis on meeting domestic demand, as opposed to exporting, their large current account surpluses may dissipate.

Our coverage extends to eight of the largest and most significant emerging markets—Brazil, China, India, Korea, Mexico, Russia, South Africa and Taiwan. The combined GDP of these eight economies amounts to USD 18.4 trillion, or 25% of the global total (though on PPP-adjusted estimates this percentage would usually be significantly higher). Meanwhile, their combined equity market capitalisation amounts to USD 3.9 trillion, 83% of the MSCI Emerging Markets Index.
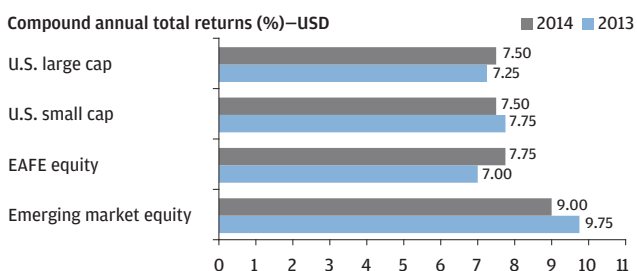
This year, we have downgraded our assumptions for real GDP for most of the emerging market countries under our coverage (the exceptions being Mexico and South Africa). The next few years could bring challenges to those countries due to excess investment capacity, which has been fuelled by credit booms.

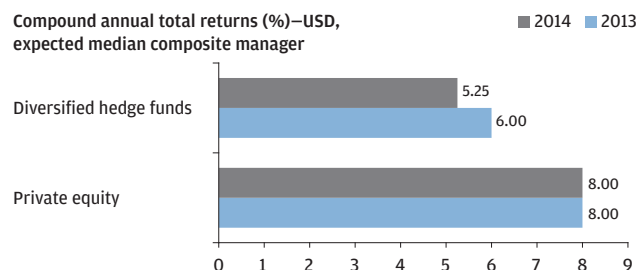**EXHIBIT 7: SELECTED LONG-TERM (10- TO 15-YEAR) CAPITAL MARKET RETURN ASSUMPTIONS**

7A: FIXED INCOME

Compound annual total returns (%)—USD   ■ 2014 ■ 2013

	2014	2013
U.S. intermediate Treasury	4.25	3.00
U.S. investment grade corporates	5.00	4.25
U.S. high yield	6.00	6.50
Emerging market sovereign debt (USD)	6.75	5.00
Emerging market local currency sovereign debt	7.00	7.50

7B: EQUITY

Compound annual total returns (%)—USD   ■ 2014 ■ 2013

	2014	2013
U.S. large cap	7.50	7.25
U.S. small cap	7.50	7.75
EAFE equity	7.75	7.00
Emerging market equity	9.00	9.75

7C: REAL ASSETS*

Compound annual total returns (%)—USD, expected median composite manager   ■ 2014 ■ 2013

	2014	2013
Diversified hedge funds	5.25	6.00
Private equity	8.00	8.00

7D: ALTERNATIVES*

Compound annual total returns (%)—USD   ■ 2014 ■ 2013

	2014	2013
U.S. direct real estate	6.00	6.50
Global infrastructure	7.25	7.75
Commodities (spot)	3.75	5.75

Source: J.P. Morgan. Estimates are as of 30 September 2013. Dark shaded area denotes 2014 assumptions and light shaded area denotes 2013 assumptions.

Indices used: Barclays U.S. Treasury 7-10 Year Index, Barclays U.S. Corporate Index, Merrill Lynch High Yield Master II Index, J.P. Morgan EMBI Global Composite Index, J.P. Morgan GBI-EM Global Diversified, S&P 500® Index, Russell 2000® Index, MSCI EAFE Index, MSCI Emerging Markets Index, NCREIF Property Index, Dow Jones-UBS Commodity Spot Index, HFRI Fund of Funds Diversified Index, Thomson Venture Economics.

*These asset classes and strategies are unlike other asset classes shown above, in that there are no underlying investable indices.

I. Thematic articles: Considerations for long-term investors

Heading for the exit

by **Michael Feser, CFA,** *Global Investment Director and Portfolio Manager, Asset Management Solutions Group*
and Grace Koo, PhD, *U.S. Head of Research and Portfolio Manager, Asset Management Solutions Group*

In brief

How the normalisation of monetary policy progresses through the balance of this decade will play a decisive role in the U.S. and global economy's full recovery from the financial crisis of 2008-09.

To provide insight on the sensitivity of return assumptions to alternative views on the normalisation process, we discuss our "most likely" view and three additional scenarios, along with their implications.

• Our most likely normalisation scenario, "the successful exit," unfolds against the backdrop of slightly above-trend growth, contained inflation and avoidance of policy derailment in the U.S., along with limited tail risks and a modest growth outlook globally.

• Under the successful exit scenario, rate increases are expected to begin in 2015, with long-term U.S. Treasury rates reaching equilibrium levels ahead of cash yields.

• Potential implications include: an adverse effect on fixed income (especially long-term Treasuries) and, to a lesser extent, REITs and high dividend stocks; a positive impact on credit debt (as spreads compress); and a neutral influence on emerging market debt.

Assessing normalisation scenarios

Five years have passed since central banks across the developed world unleashed a dizzying number of new and untested monetary policy programmes to reduce the length and depth of the great recession. The path to recovery in the U.S. since then has been uneven and the journey painfully slow when compared with prior recoveries. But with the housing construction industry, which was at the epicentre of the last crisis, finally awakening again and household balance sheet deleveraging well advanced, the question of when and how monetary policy will normalise is becoming a central topic.

While it is hard to overestimate the importance of monetary policy normalisation, we like to remind investors not to treat this as a singular event risk, but rather to expect a fairly protracted and drawn-out process. As Reinhart and Rogoff point out in their book, *"This Time It's Different: Eight Centuries of Financial Folly,"*[1] it has taken, on average, 10 years for an economy to fully recover after a systemic crisis such as the one the U.S. experienced in 2008-2009. By this measure we are today at approximately the halfway mark on the way to recovery, with the normalisation process likely to extend to the end of the decade.

To illustrate the various ways this normalisation process may unfold and its likely implications for returns across asset classes, we examine four different normalisation scenarios.

"The successful exit" is a modest growth scenario. It represents our central case and is consistent with the forecasts used to derive our 2014 *Long-term Capital Market Return Assumptions* (with return projections adjusted here to reflect the six-year time horizon of this analysis).

"Déjà vu" is, in our view, the second most likely scenario and combines a somewhat better growth outlook with less favourable inflationary expectations.

"Stuck in second gear" is a downside tail risk scenario characterised by slow U.S. and global growth, offering little impetus for unwinding current monetary policy.

"It's all a mistake" is another downside tail risk scenario in which economic growth is perceived to be weaker than it actually is, leading to a detrimental delay in monetary policy tightening.

This analysis is intended to help investors better understand the risks the base case scenario behind our *Long-term Capital Market Return Assumptions*, assess the ongoing normalisation process within a consistent framework, and evaluate the sensitivity of their portfolios to different normalisation scenarios.

The scenarios—Four ways to unwind

In assessing the four normalisation scenarios, we identify the path to monetary policy normalisation and the economic conditions under which each unfolds (see **Exhibit 1** and **Exhibit 2**). Our analysis concentrates on the extraordinary monetary policy experiment of the past five years and the potential impact of each of these policy unwinding scenarios on fixed income yields and related asset class returns over the next six years (see **Exhibit 3**). This departs from our 10- to 15-year horizon of the *Long-term Capital Market Return Assumptions*, as we focus solely on this unusual economic cycle, which is likely to be normalized by 2020.

EXHIBIT 1: ECONOMIC AND FIXED INCOME FORECASTS (2014-2020)

Scenarios	The successful exit	Déjà vu	Stuck in second gear	It's all a mistake
Economics—expected annualised compound rates (%)				
Growth vs. trend	Slightly above	Slightly above	Below	Well above
Inflation	1.5%-2.0%	3.0%-3.5%	1.0%	4.0%-4.5%
Equilibrium yield				
Cash	2.75%	4.25%	0.50%	5.50%
U.S. 10-year Treasury	4.75%	5.00%	2.50%	7.50%

Source: J.P. Morgan; as of 30 September 2013.

[1] C.M. Reinhart and K. S. Rogoff, *"This Time It's Different: Eight Centuries of Financial Folly,"* (Princeton University Press, September 2009).

EXHIBIT 2: CENTRAL BANK RATE CYCLES AND ADJUSTMENT PERIODS

Cash yields
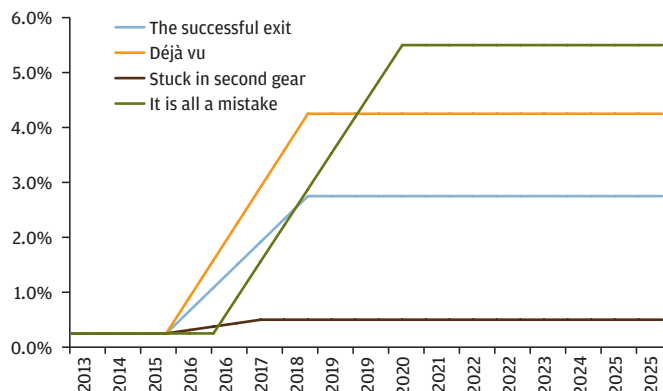
10-year U.S. Treasury yields

Source: J.P. Morgan; rankings as of 30 September 2013.

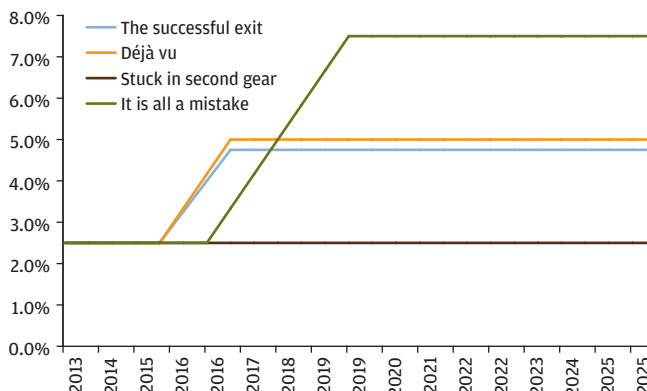**EXHIBIT 3: RETURN OUTLOOK 2014-2020**

Scenarios	The successful exit	Déjà vu	Stuck in second gear	It's all a mistake
Asset class performance/outlook				
Cash	1.25%	2.00%	0.25%	1.25%
U.S. 10-year Treasury	2.75%	2.25%	4.25%	0.25%
REITs	–	neutral	–	+
Dividend stocks	–	+	neutral	–
Credit	+	neutral	neutral	–
Emerging market bonds	neutral	+	–	neutral
Memo Item:				
Inflation rate % per annum	1.5%–2.0%	3.0%–3.5%	1.0%	4.0%–4.5%
U.S. 10-year Treasury	4.75%	5.00%	2.50%	7.50%

Source: J.P. Morgan; as of 30 September 2013.

The successful exit—Scenario 1

"The successful exit," which in our view is the most likely path to normalisation, unfolds on the back of slightly above-trend growth in the U.S. that gradually reduces economic slack.

While Washington navigates around the fiscal cliff and other policy debates without derailing the U.S. economy, inflation and tail risks remain well contained by slow but moderately successful rebalancing policies in Japan, China and the eurozone. In this environment the Federal Reserve can withdraw monetary stimulus in a timely and deliberate fashion, without adversely impacting long-term inflation expectations. Rate increases are likely to commence in 2015, with the long end of the fixed

income curve moving more rapidly through the adjustment process towards its equilibrium level relative to the cash yield, which is more firmly anchored by monetary policy.

Fixed income returns are expected to be adversely affected by this normalisation of policy rates. For longer duration assets, whose prices are more sensitive to changes in the level of interest rates, losses are likely to be concentrated in the first half of the adjustment period. Although we do not expect official rate hikes to occur before late 2015, markets may re-price long-term bond yields in anticipation of these moves. Over the six-year forecast horizon, we expect cash yields to rise to 2.75% and 10-year U.S. Treasury yields to reach 4.75%; this corresponds to per annum returns of 1.25% and 2.75% respectively.

Valuations of higher yielding assets, which have become popular with investors during the low rate environment, are expected to normalise as rates rise. REITs and high dividend stocks are likely to underperform the broader equity market as investors rotate into more cyclical sectors. The downside, however, appears limited given the ongoing recovery of the economy and the housing market. Credit debt, such as high yield bonds, will enjoy the support of solid fundamentals, leading to further spread compression that should at least partially mitigate the impact of rising Treasury yields.

Global growth should stay modest overall and not provide sufficient momentum for further rating upgrades of sovereign emerging market debt issuers. Emerging market debt will therefore struggle to offset the rate pressure through further credit spread tightening. Both market volatility and risk premia will continue to normalise in this scenario.

Déjà vu—Scenario 2

The "déjà vu" scenario may feel like an echo from the first decade of the new millennium. U.S. growth runs more firmly above the trend rate and a successful rebalancing in China, together with further integration of emerging markets into global trade flows, boosts global growth and natural resource usage, while limiting broader based inflationary pressures. Inflation expectations remain anchored, but the Federal Reserve has to work harder to reconcile higher headline inflation of 3.0%, with considerably weaker labour markets and deteriorating terms of trade. Overall, the experience is very similar to the cycle that commenced in 2001.

Rate hikes are expected to start in 2015 and to continue for roughly three years with small incremental steps—much the same as in the first scenario. What differs, however, are our expected equilibrium yields at the end of the six-year horizon. With inflation running above the Federal Reserve's long-term target, the rate hike cycle will eventually have to go further to move monetary policy into neutral territory. Cash yields would rise to 4.25% vs. 2.75% in the base case. Ten-year U.S. Treasury yields would also rise, but to a significantly lesser degree than short-term rates. This implies a much flatter curve—a smaller yield differential between 10-year U.S. Treasury bonds and cash—of 75 basis points (bps) vs. 200 bps in the base case. Returns across the yield curve would be essentially identical, with cash delivering 2.0% and 10-year bonds delivering 2.25% per annum over the next six years.

Equities are expected, at least initially, to benefit from higher growth and investors' rotation from bonds to equities as protection from higher inflation. High dividend yield stocks and other yield-oriented fixed income proxies are likely to do better as well, as investors often view these as less interest rate sensitive and better protected against rising yields. Once equilibrium yields are reached and the risk of further mark-to-market losses on bonds is diminished, however, traditional fixed income assets would be well positioned to recapture investor attention relative to the typically more volatile and more growth sensitive fixed income proxies.

Credit performance is likely to be similar to the first scenario, with the exception of loans and emerging market credit. Higher cash yields would boost returns on loans while stronger global growth would provide support for further credit rating improvements in emerging markets. Volatility and risk premia are expected to remain broadly anchored, albeit at higher levels given the uncertainty of the pass-through of higher short-term inflation into longer-term inflation expectations. In particular, periodic increases in volatility as markets reassess the risk of a policy error by the Federal Reserve are likely to occur on a regular basis.

Stuck in second gear—Scenario 3

"Stuck in second gear" is a downside risk scenario for U.S. and global growth. This scenario assumes that some of the rebalancing efforts of China, Japan and the eurozone, as well as the U.S. fiscal outlook will experience significant setbacks over the coming years. These setbacks dampen economic growth to below trend and create disinflationary pressures that even the continuation of the current policies of monetary accommodation cannot overcome. With the economy barely growing, the risk of a recession looms constantly, resulting in short, choppy, shallow cycles. The yield on cash remains low at 0.5% and the yield on 10-year U.S. Treasury bonds hovers close to its current level at 2.5%. This implies a return close to zero on cash assets and a rather decent return of 4.25% per annum on 10-year U.S. Treasuries as government bonds avoid the mark-to-market losses from rising yields.

Bond proxies and high yielding assets struggle somewhat in this environment as the appetite for yield is offset by weaker underlying fundamentals. Dividend stocks are attractive relative to more cyclical equities, but the very low nominal growth environment would challenge the asset class as a whole.

Short, choppy cycles should help underwriting discipline and avoid excess credit build up, keeping spreads tight and credit market returns attractive, even in a low growth environment. Emerging market securities, however, are likely to underperform as the sovereign rating outlook darkens in an environment of below-trend global growth and weak external demand. Overall volatility is likely to remain normal but subject to occasional jumps as event risks remain elevated. The U.S. economy is vulnerable to external shock as its underlying growth remains close to stall speed.

It's all a mistake—Scenario 4

While the risks described in Scenario 3 are likely to recede as we approach the later periods of the forecast horizon, the opposite may be said about the risks captured in the "it's all a mistake" scenario. A policy mistake can occur when small changes to seemingly marginal parameters go unnoticed over time, until their cumulative effects result in unintended consequences. In order for the Federal Reserve to effectively manage monetary policy, its readings of these underlying factors need to be close to their true states. However, labour supply and demand, as well as the non-accelerating inflation rate of unemployment (NAIRU) may change due to changes in demographics and protectionist policies. Incentive programmes aiming to attract inward investments to the developed world, as well as inflationary pressures and stronger currencies in emerging markets could also cause changes in the economic fundamentals. The Federal Reserve could extend its policy response time to changes in inflation by placing more weight on the intermediate-term inflationary outlook.

Scenario 4 envisions that a number of these parameters are, in fact, changing, though perhaps imperceptibly, causing the Federal Reserve to misjudge the true state of the economy and tightness of labour markets. Assuming more slack in the economy than there actually is, monetary policy is kept too loose for too long. Early signs of rising inflation are ignored and misdiagnosed and only when broad-based secondary round inflation effects set in, does the Federal Reserve begin to take action.

As a result, the Federal Reserve falls behind in the rate rising cycle, inflation moves up to a 4.0% handle while the economy grows well above trend. The adjustment period starts late in 2016 and the Federal Reserve has to raise interest rates significantly more than in our base case to prevent inflation from running away. This brings the equilibrium yield of cash and fixed income to the highest level among the four scenarios. We expect a 5.5% yield on cash by the end of the decade, accompanied by a 7.5% yield on 10-year U.S. Treasuries.

This rate trajectory creates substantial headwinds for duration assets, and 10-year U.S. Treasuries return 0.25% per annum over the next six years—the lowest level across all scenarios. Relatively high inflation drives up demand for real assets, such as REITs. For equities more broadly, however, the support is limited, as the rise in discount rates makes the asset class less attractive. Credit instruments, such as high yield and emerging market debt, suffer as spreads are insufficient to buffer the pain from the significant rise in yields. Spreads are likely to be adversely affected by the concern that the Federal Reserve will have to force the economy to cool down through further rate increases, to prevent inflationary pressure from starting to spiral even higher. Macro risk stays heightened and uncertainty in the rate and inflation outlook adversely impacts volatilities and risk premia.

Identifying the winners in the next decade

by **David Shairp,** *Global Strategist and Portfolio Manager, Asset Management Solutions Group*
and **Patrik Schöwitz,** *Global Strategist, Asset Management Solutions Group*

In brief

Our estimate of forward returns for U.S. equities over the coming decade suggests real per annum returns of 3.7%-4.7%, based on Arnott and Bernstein's forecast model[1] (adjusted for buybacks).

Using starting valuations based on the cyclically-adjusted price-to-earnings ratio brings the forecast return down to 3.2% per annum.

It is difficult to apply the Arnott and Bernstein model across countries, due to different dilution effects, buybacks and rates of structural change.

We have therefore adapted the framework, using multiple assessments to determine starting valuations, dividend growth drivers and dilution in the form of growth constraints.

Due to the qualitative nature of these inputs, the results have been aggregated as rankings for markets. Our final rankings show Sweden, Australia, the Netherlands, Switzerland and Taiwan are the five top-ranked markets of the 28 countries covered by our analysis.

The bottom five markets are the Philippines, Greece, India, Mexico and South Africa.

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[1] Robert D Arnott and Peter L Bernstein, *"What Risk Premium is 'Normal'?"*, (AIMR, 2002).

Equities to find the going harder

In March 2014, it will be exactly five years since global equity markets reached their post-crisis lows. Since then (at the time of writing in late October 2013) the S&P 500 has been rebounding at an annualised rate of 19.5%, or 17% in real terms[2]. This compares to a long-term average real return for U.S. equities of just over 6.3% per annum[3].

This is a slightly unfair comparison, given that the former starts from the bottom of a bear market. Nevertheless, with equity market valuations now back to more neutral ranges, the torrid performance of the last few years seems less likely to be sustained.

Arnott and Bernstein (A&B) introduced a simple but elegant framework to estimate a forward-looking equity risk premium for U.S. equities, based on history, by estimating expected real returns for stocks and bonds. Central to this approach is an implied mean reversion of valuations, as A&B used the starting dividend yield as part of their framework. Their estimate of for-ward-looking 10-year returns is based on the following inputs:

- Current dividend yield, plus
- A proxy for real dividend growth over the next 10 years (% per annum), less
- A dilution factor

The most important driver of the estimated returns is the starting level of the dividend yield, which is one of the reasons why we focus on the expected contribution of dividends to total returns over the coming decade. This also effectively builds in the discipline of mean reversion, helping to overcome the over-confidence bias that analysts can experience from rising equity markets.

The default proxy for real dividend growth, used by A&B, is trailing real per capita GDP growth over the past 10 years. While this may seem a strange proxy for *future* dividend growth, it is a measure of productivity growth, which tends to drive real dividend growth. The dilution factor measures the

tendency for dividend growth to lag GDP growth. Over the 192 years of the A&B study, real dividends grew 1% per annum, while real per capita GDP growth was 1.8% per annum. A&B used a forward-looking dilution factor of -0.6% per annum.

While simple, this framework has been effective and accurate. Written in April 2002, the paper projected U.S. real equity returns for the next 10 years of 2%–4% per annum, well below historical levels and with an equity risk premium close to zero. In the event, real equity returns averaged 1.7% per annum.[4]

Updating this exercise for current market levels, suggests an expected U.S. real return of approximately 2.2% per annum over the coming decade. This is based on a starting divided yield of 2.1%, plus real per capita GDP growth of just 0.7%, less the assumed dilution factor of -0.6%. Clearly, corporate buybacks are not allowed for, so adding (say) a further 1.5%-2.5% (in line with recent U.S. experience) would suggest real returns of 3.7%-4.7% per annum.

An alternative approach to estimating real returns is to use the cyclically-adjusted price-to-earnings (CAPE) ratio as a measure of initial valuation. CAPE deflates the market index by 10-year average earnings, while the version of CAPE popularised by Professor Robert Shiller deflates by 10-year inflation-adjusted earnings. The starting valuation level has tended to offer a reasonable estimate of future returns.

Exhibit 1 shows a scatter plot of U.S. CAPE ratios from 1881 to September 2003, using Professor Shiller's data against subsequent 10-year real returns. History suggests that at the current CAPE of 22.9x, real returns could average 3.2% per annum over the next decade, with a percentile rank of 88%.

EXHIBIT 1: SHILLER PRICE-TO-EARNINGS RATIO AND SUBSEQUENT 10-YEAR AVERAGE REAL RETURNS

$$y = -0.0046x + 0.1389$$
$$R^2 = 0.32575$$
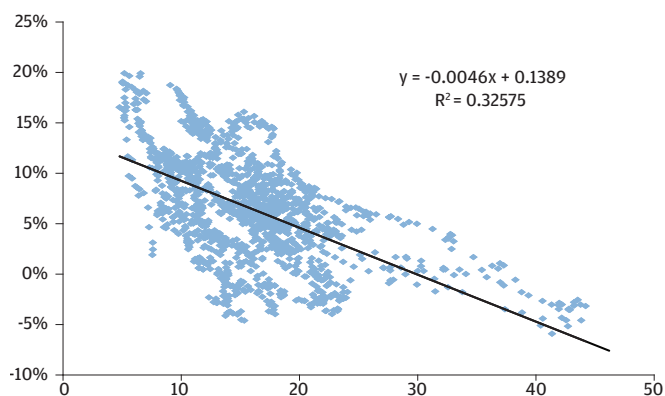
Source: Professor Robert Shiller, S&P 500 returns; monthly data from January 1881 to September 2003.

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[2] Annualised returns between March 2009 and September 2013, using data from Professor Robert Shiller's database, found on http://www.econ.yale.edu/~shiller/

[3] Real total return data covering period from January 1881 to September 2013, estimated from Professor Robert Shiller's database, found on http://www.econ.yale.edu/~shiller/

[4] Annualised returns between April 2002 and April 2012, estimated from Professor Robert Shiller's database, found on http://www.econ.yale.edu/~shiller/

Drivers of growth across countries

Unfortunately, the A&B framework travels across markets only with difficulty. There are three reasons for this. First, the amount of dilution varies greatly between countries and also over time. It was found that aggregate dividend growth lagged aggregate economic growth in a wide range from country to country[5]. In this analysis, which covered 16 countries between 1900 and 2000, it was found that the dilution in dividend growth vis-a-vis real per capita GDP growth ranged from an annualised +0.3% per annum (in the case of Sweden) to -6.4% per annum in the case of Japan. The average of the full sample was -2.4% per annum, though this was skewed by the case of the "war-torn" nations of Europe and Japan. Excluding the "war-torn" sample, the average dilution was -1.1% per annum.

Second, buybacks vary across markets and can distort the level of the dividend yield. This has been most prevalent in the U.S., where buybacks have supplemented generally meagre dividend yields compared to other international markets. Professor Aswath Damodaran has estimated that buybacks in the U.S. market have ranged from 1¼%-1¾% in the early 2000s to a peak of 4½% in 2007 before falling during the financial crisis of 2008-09. He estimated that buybacks amounted to 3.1% of the index level in 2012, significantly outstripping dividends, which amounted to 2.2%[6].

The third reason is structural change, where past trends in productivity may not be repeated over the next decade. Significant structural change over the past decade in emerging markets and the lingering impact of the financial crisis of 2008-09 in developed markets has changed their rates of potential growth. We will address this factor in greater detail, using a simple framework.

Our equity market framework

We have adapted the A&B framework to allow equity returns to be driven by starting valuations and factors influencing real dividend growth on a forward-looking basis. We have then applied this framework to 28 countries, both developed and

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[5] William J Bernstein and Robert D Arnott, "*Earnings Growth: The Two Percent Dilution,*" (AIMR, September/October 2003).

[6] Estimates by Professor Aswath Damodaran, http://aswathdamodaran.blogspot.co.uk/2013/03/a-sweet-spot-for-us-equities.html

[7] We have looked at 14 markets that we have classified as developed (Australia, Canada, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, Spain, Sweden, Switzerland, the UK and the U.S.) and 14 markets that we have classified as emerging (Brazil, China, Hong Kong, India, Indonesia, Korea, Malaysia, Mexico, the Philippines, Russia, Singapore, South Africa and Thailand).

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emerging markets[7]. We rely on multiple assessments to determine starting valuations, dividend growth drivers and dilution in the form of growth constraints–as shown in **Exhibit 2**.

Given the qualitative nature of many of the factors, we have decided to frame the output of our process as a ranking of countries, rather than creating spurious accuracy by calculating a single expected return number for each country.

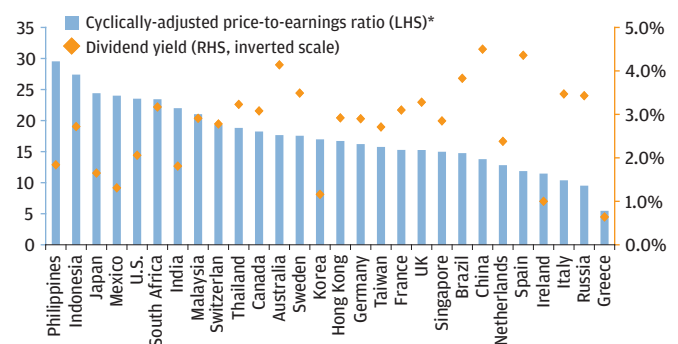**EXHIBIT 2: EQUITY RETURNS FRAMEWORK**
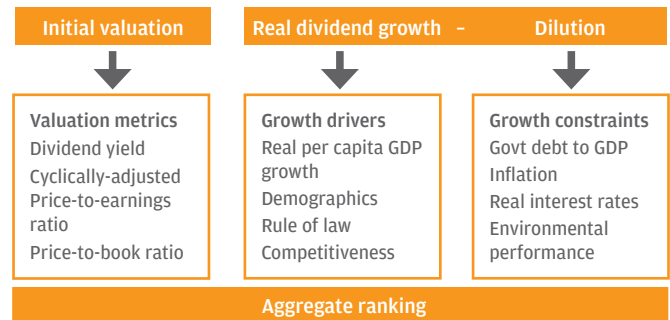
Source: J.P. Morgan.

Specifically, we have looked at 11 factors that should influence the long-term outlook for the 28 equity markets that we have covered, and have calibrated the scores so that better ratings attract a lower score (a score of 1 is the best of the 28 countries, while a score of 28 is the worst). The lowest aggregate scores represent the most attractive markets.

(1) Valuations

Our valuation criteria show mixed results, with a marked divergence between the rankings based on dividend yield vs. the CAPE. **Exhibit 3** shows that, for example, Greece ranks best on a CAPE basis, while being the worst ranked based on yield. The third factor, price-to-book ratios, adds an additional perspective.

EXHIBIT 3: VALUATION RANKINGS, CAPE VS. DIVIDEND YIELD

Source: J.P. Morgan, Thomson Reuters Datastream; data as of 30 September 2013. *Note: Cyclically-adjusted price-to-earnings ratio is calculated as the current index level relative to trailing 10-year average earnings per share.

Exhibit 4 displays the aggregate results of our valuation analysis, which show that the most attractive valuations are currently to be found in the eurozone periphery and the BRIC markets (Brazil, Russia, India and China)—with the notable exceptions of Greece and India.

EXHIBIT 4: VALUATION RANKINGS

	Dividend yield	Cyclically-adjusted price-to-earnings ratio	Price-to-book ratio	Aggregate rank
Russia	3.4%	9.5	0.8	1
Italy	3.5%	10.4	0.9	2
China	4.5%	13.8	1.3	3
Spain	4.4%	11.9	1.4	4
Brazil	3.8%	14.8	1.4	5
France	3.1%	15.3	1.5	6
Singapore	2.9%	15	1.4	7
UK	3.3%	15.3	1.7	8
Netherlands	2.4%	12.8	1.5	9
Australia	4.1%	17.7	2.1	10
Sweden	3.5%	17.6	2.1	11
Hong Kong	2.9%	16.7	1.6	12
Germany	2.9%	16.2	1.6	13
Ireland	1.0%	11.5	1.6	14
Korea	1.2%	17	1.2	15
Canada	3.1%	18.2	1.9	16
Taiwan	2.7%	15.8	2	17
Thailand	3.2%	18.8	2.5	18
Japan	1.7%	24.4	1.4	19
Malaysia	2.9%	21	2.2	20
Greece	0.6%	5.5	-0.2	21
South Africa	3.2%	23.4	2.8	22
Switzerland	2.8%	19.3	2.5	23
India	1.8%	22	2.1	24
U.S.	2.1%	23.5	2.6	25
Indonesia	2.7%	27.4	3.8	26
Philippines	1.8%	29.5	2.7	27
Mexico	1.3%	24	2.8	28

Source: J.P. Morgan. Rankings based on data available to 30 September 2013.

(2) Growth drivers

In the spirit of A&B, we start with trailing real per capita GDP growth as an initial proxy for future real dividend growth. This metric may in isolation give misleading results, because the next decade may see very different economic performance from the last decade.

We have long argued that the financial crisis of 2008-09 ushered in a new period of slower growth and shorter, choppier business cycles—thereby suggesting that the previous macroeconomic performance was unlikely to be repeated. For example, we believe that China is currently at a turning point that will result in significantly lower growth over the next 10-to-15 years. To include this type of assessment in our framework we have identified three drivers of future growth: demographics, the rule of law, and competitiveness.

Both demographic factors and labour force growth have traditionally been strong predictors of economic growth in development literature. We used United Nations data to estimate the growth in the labour force between 2015 and 2025. On this basis, deteriorating demographics in two of the BRICs (Russia and China) are expected to result in slower or contracting labour forces over the next decade (see Exhibit 5).

We seek to capture the Institutional rule of law, using data published by the World Justice Project (WJP)[7]. The WJP Rule of Law Index is a quantitative assessment produced by the WJP to gauge the extent to which countries adhere to the rule of law in practice. It estimates nine aggregate dimensions (which disaggregate into 48 sub factors built from over 400 variables based on general assessments in 97 countries, both from the general public and from local legal experts). We have averaged across the nine main dimensions[8] to gauge an aggregate rule of law index, which we have ranked across our sample of 28 countries (see Exhibit 6). The 10 lowest-scoring countries are all emerging markets.

EXHIBIT 5: LABOUR FORCE GROWTH, 2015/25, % PER ANNUM
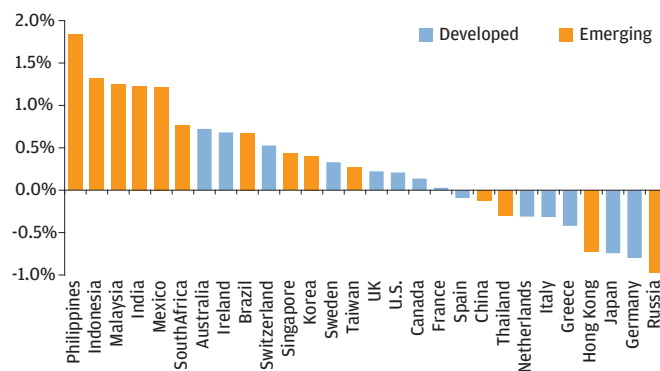
Source: United Nations World Population Prospects: The 2012 Revision.

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7 Agrast, Botero, Martinez, Ponce & Pratt, WJP Rule of Law Index® 2012-13, Washington DC, the World Justice Project.

8 The nine dimensions comprise: limited government powers, absence of corruption, order and security, fundamental rights, open government, regulatory enforcement, civil justice, criminal justice, and informal justice.

EXHIBIT 6: RULE OF LAW INDEX
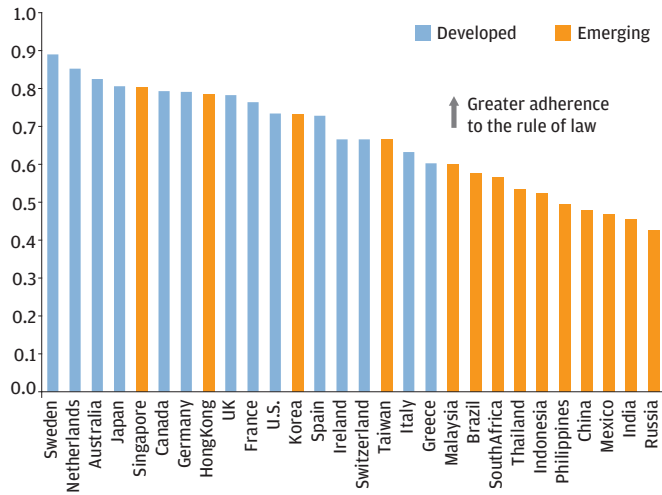
Source: World Justice Project, Rule of Law Index, 2012/13. Note: The WJP's Rule of Law Index is a quantitative assessment tool designed to offer a detailed and comprehensive picture of the extent to which 97 countries and one jurisdiction around the world adhere to the rule of law. The aggregate is an average of eight aggregated criteria calculated by the World Justice Project (limited government powers, absence of corruption, order and security, fundamental rights, open government, regulatory enforcement, civil justice, and criminal justice). Scores are scaled from 0 to 1 (where 1 signifies higher adherence to the rule of law). Data is not available for Ireland, Switzerland and Taiwan, so their scores have been neutralised by taking the average of the sample.

To rank competitiveness, we used the Global Competitiveness Index (GCI) published annually by the World Economic Forum[9]. This study states that competitive economies enable productivity enhancements, thereby generating income growth and raising economic growth potential. The authors define competitiveness as "the set of institutions, policies and factors that determine the level of productivity of a country". The level of productivity "also determines the rates of return obtained by investments in an economy, which in turn are the fundamental drivers of its growth rates." The GCI covers 144 countries and is composed of 12 pillars of competitiveness:

- Institutions
- Infrastructure
- Macroeconomic environment
- Health and primary education
- Higher education and training
- Goods market efficiency
- Labour market efficiency
- Financial market development
- Technological readiness
- Market size
- Business sophistication
- Innovation

It is striking that the developed markets in our sample dominate the rankings according to competitiveness, with European countries making up half of the top 10 (**Exhibit 7**), while the eight of the lowest 10 countries belong to the emerging markets.

EXHIBIT 7: GLOBAL COMPETITIVENESS INDEX
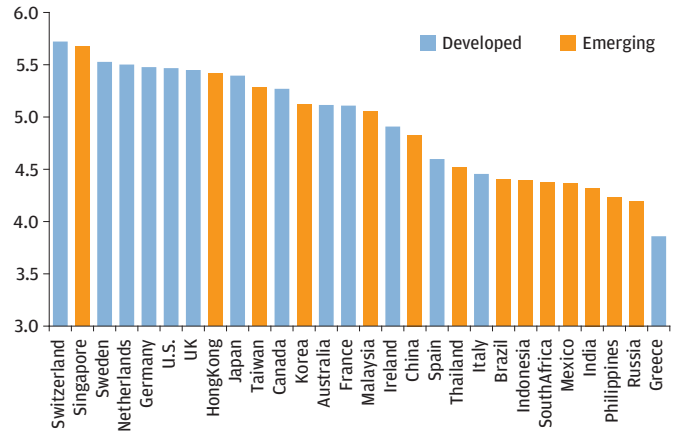
Source: J.P. Morgan, World Economic Forum Global Competition Report 2012-13.

We have summed the rankings of the four metrics to arrive at our overall rankings (**Exhibit 8**). The higher ranking markets include Singapore, Sweden, Australia, Switzerland and Taiwan. Notably China appears to have less robust forward-looking growth prospects, despite having had the highest historical growth rate (according to our real GDP per capita measure), when these factors are taken into account.

It is intriguing that the four BRICs are in the lower half of the table—perhaps undermining the traditional marketing hype about the BRICs being the next big growth story. The U.S. and UK are ranked in the middle, held back by historical growth rates, though they would rank in the top seven based solely on the forward-looking factors.

(3) Growth constraints

The impact of deleveraging will continue to be a theme over the investment horizon of the *Long-term Capital Market Return Assumptions*. Specifically, we agree with the view expressed by Reinhart and Rogoff (R&R)[10], that a high level of public sector debt will have an impact on future levels of economic growth. While we would not necessarily look for a specific trigger level of debt that would encourage us to downgrade trend economic growth assumptions (such as the widely quoted 90% threshold used by R&R) higher public debt levels are clearly detrimental.

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9   Sala-I-Martin, Bilbao-Osorio, Blanke, Crotti, Drzeniek-Hanouz, Geiger, and Ko, Global Competitiveness Report 2012-13, World Economic Forum.

10   Carmen Reinhart and Kenneth Rogoff, *"Growth in a Time of Debt,"* (American Economic Review, 2010).

Exhibit 9 shows government debt to GDP ratios across our country universe. It is immediately notable how sizeable Japan's public debt is (although its net debt level is significantly lower). By contrast, Chinese official data for public debt is very low, although it has been estimated by some private sector economists that the underlying level of overall public debt is much higher once full allowance is made for the fiscal problems of China's local governments.

## Future potential vs. the present: A problem with ranking growth drivers

A tricky problem when ranking countries in the way we have described is what has sometimes been referred to as the 'Congo issue'. Simply put, the argument is that a low starting point in these rankings is an indication of potential for future improvement, which if achieved would be a huge growth driver itself. The problem is to decide which economies are going to make the necessary changes in order to move up the rankings. Otherwise, if a low starting point was all that mattered, why not invest all your money in the Congo, the poorest country in the world, and wait for the catch-up?

EXHIBIT 8: GROWTH DRIVER RANKINGS

|	Real per capita GDP growth	Demographics	Rule of Law	Global competiveness	Aggregate rank
Singapore	4.70%	0.40%	0.80	5.67	1
Sweden	1.50%	0.30%	0.89	5.53	2
Australia	1.50%	0.70%	0.83	5.12	3
Switzerland	1.20%	0.50%	0.67	5.72	4
Taiwan	3.70%	0.30%	0.67	5.28	5
Malaysia	3.30%	1.20%	0.60	5.06	6
Hong Kong	3.90%	-0.70%	0.79	5.41	7
Korea	2.60%	0.40%	0.73	5.12	8
Netherlands	0.70%	-0.30%	0.85	5.50	9
Indonesia	4.20%	1.30%	0.52	4.40	10
U.S.	0.90%	0.20%	0.73	5.47	11
UK	0.70%	0.20%	0.78	5.45	12
Canada	0.80%	0.10%	0.79	5.27	13
Germany	1.30%	-0.80%	0.79	5.48	14
India	6.40%	1.20%	0.46	4.32	15
Japan	0.80%	-0.70%	0.81	5.40	16
Philippines	3.30%	1.80%	0.49	4.23	17
Brazil	2.40%	0.70%	0.58	4.40	18
China	9.90%	-0.10%	0.48	4.83	19
South Africa	2.30%	0.80%	0.56	4.37	20
Ireland	0.10%	0.70%	0.67	4.91	21
France	0.40%	0.00%	0.76	5.11	22
Thailand	3.50%	-0.30%	0.53	4.52	23
Mexico	1.30%	1.20%	0.47	4.36	24
Spain	0.20%	-0.10%	0.73	4.60	25
Russia	4.80%	-1.00%	0.43	4.20	26
Italy	-0.50%	-0.30%	0.63	4.46	27
Greece	-0.60%	-0.40%	0.60	3.86	28

Source: J.P. Morgan, Thomson Reuters Datastream, United Nations, World Justice Project, World Economic Forum, National sources; as of September 2013.

EXHIBIT 9: GOVERNMENT DEBT, % OF GDP*
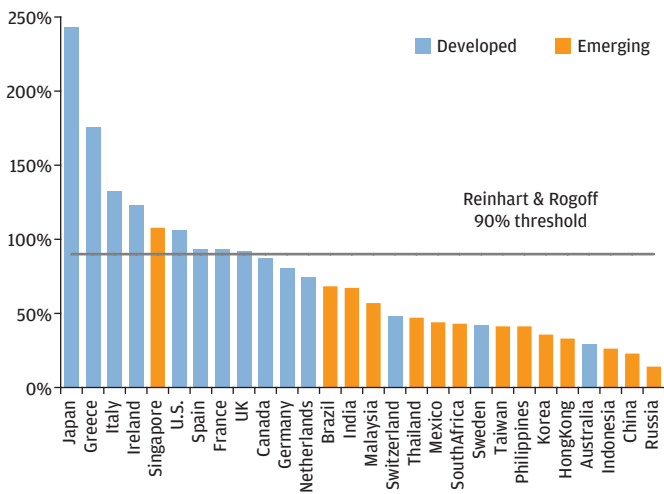
Source: International Monetary Fund, World Economic Outlook Database; as of October 2013. *Note: General government gross debt as a percentage of GDP.

EXHIBIT 10: INFLATION
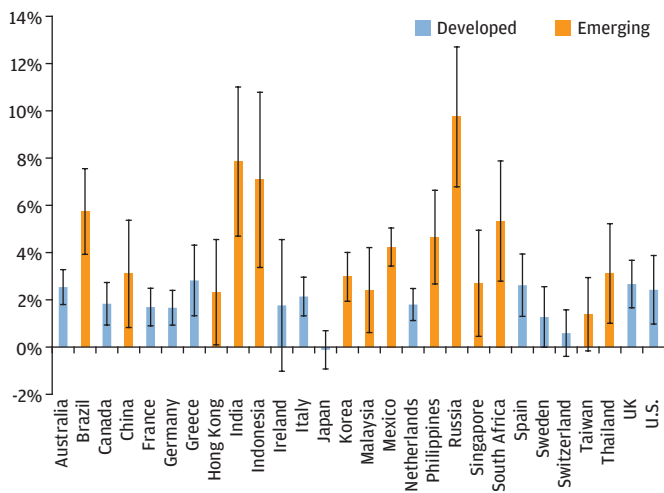
Source: J.P. Morgan, Thomson Reuters Datastream; monthly data to September 2013. Note, the chart shows the 10-year average annualised inflation rate (bars) together with a one standard deviation range around these averages.

Another key long-term theme has been the question of inflation. Indeed, a previous editor of the *Long-term Capital Market Return Assumptions* used to quip that inflation was ultimately the answer to every economic question. We have analysed two measures of inflation to help us gauge the constraint that inflation represents: the 10-year average inflation rate and the volatility of annual inflation over the past decade. We have ranked both measures and taken the average of the two sets of rankings.

Exhibit 10 shows 10-year average year-on-year inflation rates for our 28-country sample, together with a +/- one standard deviation range around these averages. Arguably, the ideal operating environment for companies is to have low average levels of inflation, as well as a lack of volatility.

Real bond yields are another growth constraint. One might expect a high cost of capital to hinder investment and thereby overall economic growth, but we have inversely ranked the real cost of capital to assess the scope for a decline in the real cost of capital and the potential for a market re-rating.

Exhibit 11 shows real bond yields compared to average real GDP growth over the past decade. It is notable that in most cases, real interest rates are below historical trend rates of growth, with the exceptions of Brazil, Japan, Greece, Ireland, Italy and Spain. It is understandable that the periphery still experiences crippling level of real interest rates, which reflect the deflationary forces in the periphery. Yet the high real interest rates in Brazil are probably a reflection of the tight monetary policy pursued by the authorities.

EXHIBIT 11: REAL INTEREST RATES VS. HISTORICAL REAL GDP GROWTH*
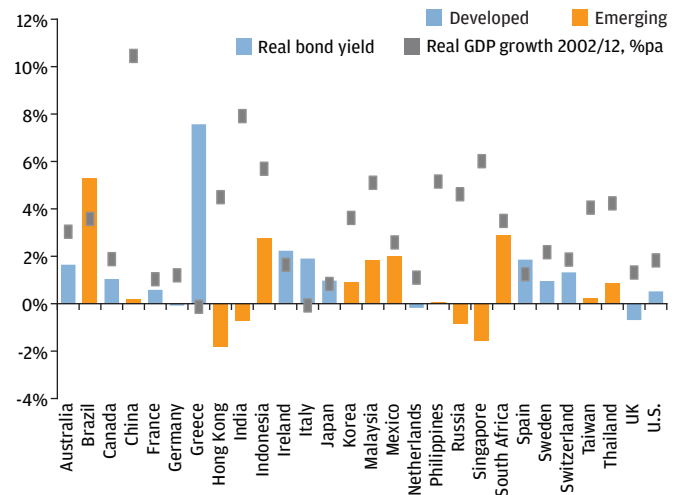

Source: J.P. Morgan, Thomson Reuters Datastream; data to September 2013. *Note: Real interest rates equal 10-year government bond yields less three-year average headline inflation.

Our final factor that can act as a long-term drag on economies and thus markets is environmental performance (**Exhibit 12**). We have used the Yale University Environmental Performance Index (EPI)[11], which tracks outcome-oriented indicators for 132 countries. The EPI is based on two main objectives of govern-ment policy: environmental health and ecosystem vitality, with each country evaluated on 22 performance indicators spanning 10 policy categories:

- Environmental health
- Water (effects on human health)
- Air pollution (effects on human health)
- Air pollution (ecosystem effects)
- Water resources (ecosystem effects)
- Biodiversity and habitat
- Forests
- Fisheries
- Agriculture
- Climate change and energy

EXHIBIT 12: ENVIRONMENTAL PERFORMANCE INDEX, 2012
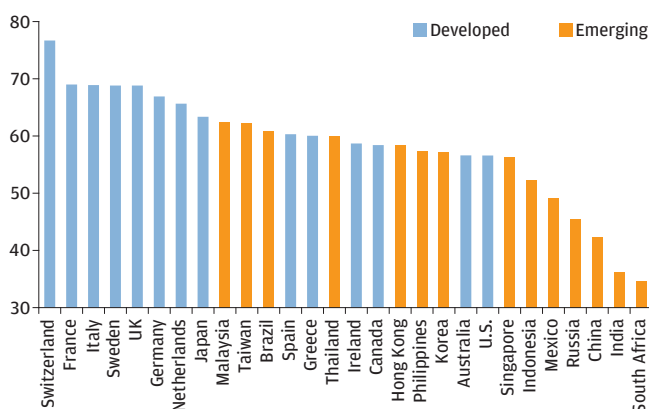
Source: Yale Centre for Environmental Law and Policy, Yale University; Centre for International Earth Science Information Network, Columbia University. Note: Data for Hong Kong is unavailable so its score has been neutralised to the average of the other 27 countries.

EXHIBIT 13: GROWTH CONSTRAINTS RANKINGS

	Government debt to GDP	Inflation rank	Real bond yield	Environmental performance	Aggregate rank
Switzerland	48.2%	5	1.3%	76.7	1
Sweden	42.2%	6	1.0%	68.8	2
Australia	29.1%	7	1.6%	56.6	3
Italy	132.3%	7	1.9%	68.9	4
France	93.5%	4	0.6%	69	5
Germany	80.4%	1	0.0%	66.9	6
Malaysia	57.0%	15	1.8%	62.5	6
Taiwan	41.3%	10	0.2%	62.2	6
Japan	243.5%	1	1.0%	63.4	9
Netherlands	74.4%	3	-0.2%	65.7	9
Brazil	68.3%	23	5.3%	60.9	11
Mexico	44.0%	12	2.0%	49.1	12
Canada	87.1%	7	1.0%	58.4	13
Indonesia	26.2%	26	2.7%	52.3	14
Korea	35.7%	16	0.9%	57.2	14
Spain	93.7%	14	1.9%	60.3	14
UK	92.1%	11	-0.7%	68.8	17
Greece	175.7%	19	7.6%	60	18
Ireland	123.3%	17	2.2%	58.7	19
Thailand	47.1%	21	0.9%	60	20
South Africa	43.0%	25	2.9%	34.6	21
Hong Kong	33.0%	17	-1.8%	58.3	22
Philippines	41.2%	22	0.1%	57.4	23
China	22.9%	23	0.2%	42.2	24
U.S.	106.0%	12	0.5%	56.6	25
Russia	14.1%	26	-0.8%	45.4	26
India	67.2%	26	-0.7%	36.2	27
Singapore	107.8%	20	-1.6%	56.4	27

Source: J.P. Morgan, International Monetary Fund, Thomson Reuters Datastream, Yale Centre for Environmental Law and Policy, Yale University; Centre for International Earth Science Information Network, Columbia University. Assessments made as of October 2013.

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[11] Emerson, Hsu, Levy, de Sherbinin, Mara, Esty and Jaiteh, 2012, *"Environmental Performance Index and Pilot Trent Environmental Performance Index,"* (New Haven: Yale Centre for Environmental law and policy).

To aggregate the growth constraints, we have summed the rankings of the four metrics mentioned above to arrive at our overall rankings (**Exhibit 13**). Switzerland and Sweden are the two top-rated countries on this set of criteria, followed by Australia, Italy and France.

Overall conclusions

Our final rankings are shown in **Exhibit 14**, which shows Sweden, Australia, the Netherlands, Switzerland and Taiwan are the five top-ranked markets. The bottom five markets are the Philippines, Greece, India, Mexico, and South Africa.

Three observations stand out from this analysis. First, seven of the 10 top-ranked markets are developed markets. Second, it is significant that the BRICs have not fared better, despite Brazil, China and Russia being in the top five for valuation. Brazil is the highest ranked BRIC market at tenth, with China eighteenth. Indeed, it is surprising that China has not made the top five; the irony is that on the set of criteria where China should perform well (growth drivers), it ranks relatively poorly.

The third surprise is that the eurozone periphery does not rank higher. Italy is the highest rated peripheral market at seventh—equal with France and Germany—while Spain and Ireland languish in the middle of the table, with Greece near the bottom. The important lesson is that the weight given to valuation is crucial. While depressed valuations can throw up short-term opportunities, policymakers need to create a long-term growth dynamic and address growth constraints, if their markets are to produce superior long-term returns.

Any ranking process over the longer term will necessarily be qualitative and there can be no specific formula that will generate exact returns over the next 10 years. We have therefore introduced this framework to guide our assessment of equity markets over the next decade, but have not sought to predicate our return estimates on its results.

EXHIBIT 14: FINAL RANKINGS FOR EQUITY MARKETS[12]
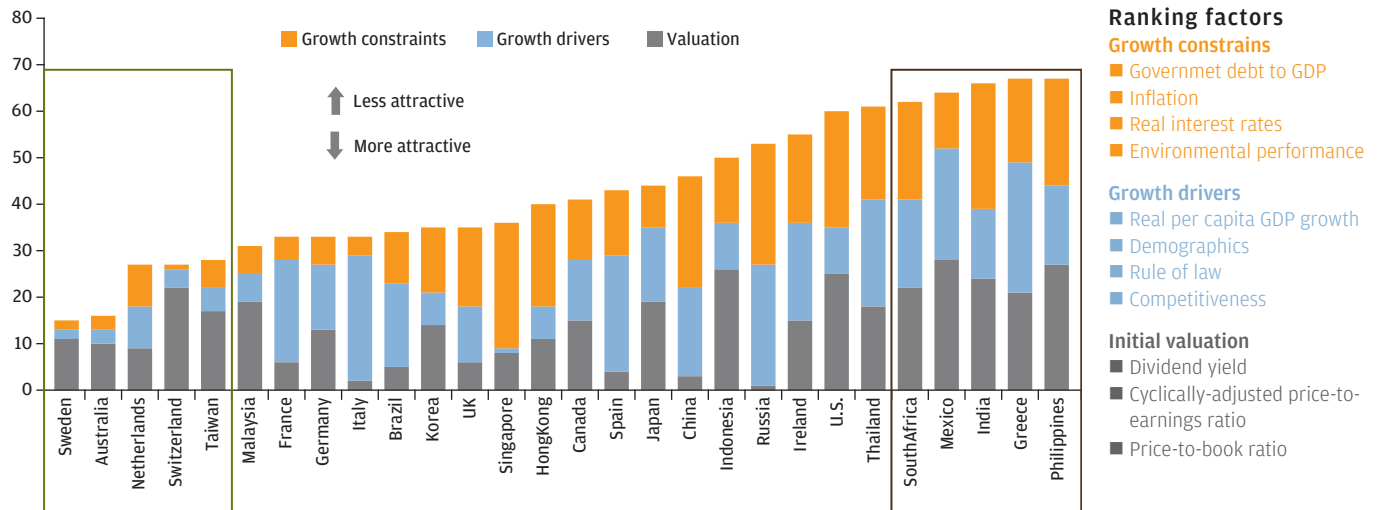
Source: J.P. Morgan; rankings as of September 2013.

[12] In detail we determine: a) Valuation through 1) dividend yield (high yields rank favourably), 2) cyclically-adjusted price-to-earnings ratio (low multiples rank favourably), 3) price-to-book ratio (low multiples rank favourably); b) Growth drivers through 1) real per capita GDP growth over the past 10 years as per the A&B original framework (high growth rates rank favourably), 2) demographics—specifically labour force growth 2015/25 based on United Nations forecasts (high growth rates rank favourably), 3) institutional rule of law according to the World Justice Project (high scores rank favourably), 4) world competitiveness according to the World Economic Forum Global Competitiveness Index (high scores rank favourably); c) Growth constraints through 1) government debt as a percentage of GDP (low debt ratios rank favourably), 2) inflation persistence (here we have ranked countries based on their average inflation rates over the past 10 years and by the standard deviation of inflation over the same period so that our composite rank takes the average of these two rankings), 3) real bond yields (higher yields rank favourably as scope for a decline in the real cost of capital suggests the potential for a market re-rating), 4) environmental performance using the Yale University Environmental Performance Index (high scores rank favourably).

An inflection point in the commodity supercycle

by Anthony Werley, *Chief Portfolio Strategist, Endowments & Foundations Group*

In brief

The commodities supercycle, originating in 2002, has entered a more subdued phase, tempered by slower global growth and a less ravenous demand for commodities alongside a 10-year revival of supply.

However, we do not believe that the supercycle has run its course. In our view, the cycle is moving towards a more balanced growth and supply dynamic. This is likely to produce more muted but still positive U.S. dollar-based real returns for commodities, with substantial volatility, over our 10- to 15-year assumptions horizon.

• Growth in demand for commodities is expected to ease, given slower global growth, more efficient use of commodities as an input factor and marginally less interest in commodities from asset allocators.

• Incremental supply of commodities is expected to moderate, due to: softer demand, more challenging production cost economics, increasing price volatility, higher costs of capital compounded by greater capital requirements, and fundamental externalities—such as environmental degradation and resource nationalism.

The commodities supercycle so far (2002–2011)

The return trajectory of commodities[1] over the past 10 years is in stark contrast to the normal cyclically-driven path of returns. Simply stated, the expected return pattern of a "normal" cycle is one of significant real returns in the upturn of an economic/demand cycle followed by substantial losses in the back half of the cycle as supply increases and demand wanes. Over the course of a full cycle returns have averaged to the rate of inflation or less, depending upon the commodity. However, every cycle and commodity in the past has had some nuance in terms of the global growth environment, individual commodity demand/supply characteristics, geopolitical issues and other idiosyncrasies.

Since 2002, commodities broadly have been in what is generally referred as a "supercycle"—a 15- to 20-year or longer time frame wherein a broad range of commodity returns outstrip nominal global GDP growth, or at a minimum, produce above trend-line returns. The catalyst to the present extended cycle is the introduction of substantial new demand emanating from the onset of a new global economic cycle in the early 2000s, and this has been accelerated by the industrial development of China and other emerging economies. This new surge in demand swamped the availability of incremental supply eviscerated by the long-term underinvestment in capital expenditure during the previous few cycles.

The cycle in transition

The return from a broad basket of commodities has been negative since September 2011. The decline is largely the result of a flattening of the overall demand curve for commodities, driven primarily by a slower global growth environment coupled with an increase in supply following multiple years of significant capital expenditures.

Of course, demand/supply conditions across, and even within, different segments of the commodities market have had an influence on returns. Consider the current conditions for West Texas Intermediate (WTI) and Brent crude, for example. Traded in the U.S., with distribution constrained by infrastructure and export limitations, ample supply of WTI means elasticity of demand, on the margin, is the key catalyst for price behaviour. Conversely, supply constraints for Brent crude relative to its global market demand make supply, on the margin, the key catalyst for this commodity. However, at the aggregate level (our perspective in developing long-term return assumptions), slowing demand and the increasing availability of supply across the commodities markets appears to have created much more price-elastic conditions.

Two years of sub-par global economic growth and at least the short-term possibility for continued negative price returns raises the prospect that the supercycle of the 2000s has run its course. We believe, however, that this cycle is not in decline, but in transition to a more balanced growth and supply dynamic producing more muted but still positive global real returns.

There are meaningful macroeconomic and microfinance differences between the forward 10- to 15-year outlook and the 2002–2011 time frame that generated between 6% and 7% per annum real commodity returns. Both demand and supply have experienced significant inflection points over the past few years. External factors that may impact future demand and supply, such as environmental, regulatory and efficiency of factor input issues, were barely on the radar screen at the inception of the cycle. Most importantly, Chinese growth and the resulting voracious demand for commodities have taken a major step lower.

The remainder of this supercycle, we believe, will more closely resemble the historical pattern of more muted returns and ample volatility. As a consequence of lower global growth and the current lower level of prices, production cost discipline, at least by the rational commodity producers, should begin to lay the seeds for a semblance of demand/supply balance. At some point a re-acceleration of global and, to a lesser extent, Chinese growth, albeit not at the previous levels, should partially restore the demand side of the equation. When environmental, regulatory, tax, labour, litigation and extraction degradation issues along with the potential for resource nationalism are factored in, some modest real rate of return seems reasonable to assume over the 10- to 15-year evaluation time frame for our assumptions. No attempt is made to consider peak supply or "we are running out of stuff" thinking. Our base expectation is for a resumption of positive real rates of return, though meaningfully below those experienced in the heydays of the 2002-2011 period.

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[1] As a reference point our return and risk projections are based upon a broad commodity index, the DJ UBS Index, which has the following composition: crude oil 17.3%, base metal 16.7%, precious metal 12.6%, natural gas 11.8%, soy 10.4%, refined products 7.6%, foodstuff 6.1%, livestock 5.5%, corn 5.2%, wheat 4.5%, fibres 2.3%. For the purpose of this analysis, we considered the three major categories of energy, metals and agriculture in broad terms and have not considered the particular details of demand/supply dynamics for each commodity within the index.

Demand estimation

For the past 10 years our base commodity demand assumption has simply but effectively been the growth of global nominal GDP. Our re-assessment of the multi-year demand outlook begins with a meaningful decrement to future expected growth vs. the global growth rates experienced in the first decade of the supercycle. The 10-year forward-looking global growth outlook according to our 2014 *Long-term Capital Market Return Assumptions* is 5.5% per annum. By comparison, global nominal growth for the 2002-2011 time frame was approximately 7.8% per annum.

More importantly, our forward looking long-term growth estimate for China is 6.5% per annum vs. 10.5%, the 2011 trailing 10-year realised growth rate. As China has been an important driver of global growth and the overwhelming marginal consumer of many industrial and energy commodities over the supercycle years, the diminution in Chinese growth is a key determinant of the overall commodity outlook. **Exhibit 1** illustrates the strong correlation between Chinese growth and commodity prices.

EXHIBIT 1: CHINA GROWTH VS. COMMODITY PRICES (1991-2012)
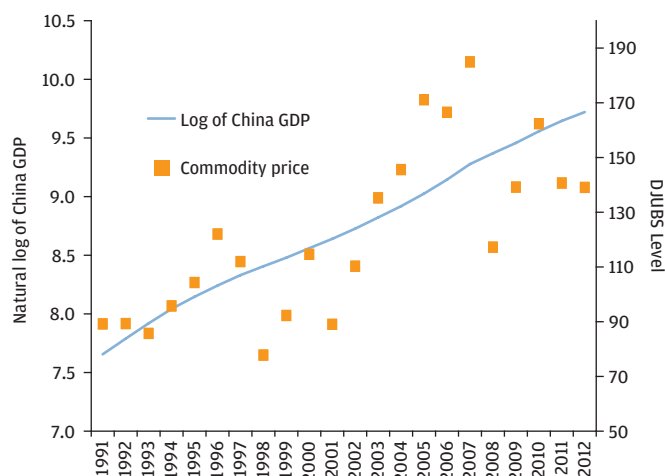
Source: J.P. Morgan, Bloomberg, International Monetary Fund; data as of 16 July 2013.

We have, in the last couple of years, applied an efficiency factor as a decrement to demand growth reflecting the ability of China and other modernising countries to economise on the factors of production, including commodity inputs. This is in line with resource usage patterns for other recently developed economies, where the intensity of usage tends to fall over time.

On the non-commercial side of the demand equation, financial asset allocators have created a new source of demand throughout the commodity complex (**Exhibit 2**). As commodity prices taper their long-term rate of ascent, this non-fundamental source of demand should wane as well. The plethora of single commodity and index exchange-traded funds (ETFs) will likely serve as a small source of incremental demand going forward, but primarily as a source of volatility, as demonstrated by the panic selling in mid 2013 out of gold ETFs.

EXHIBIT 2: TOTAL U.S. COMMODITY ETF MARKET CAP
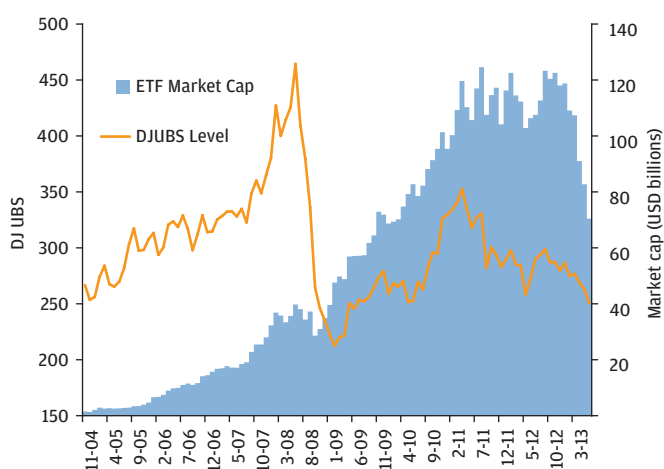
Source: J.P. Morgan, Morningstar Direct; data to 30 June 2013, as of 15 July 2013. DJUBS = Dow Jones UBS commodity index.

Rational supply increments

Supply across all broad commodity sectors has surged since the Chinese and global economic rebound beginning in 2002. True to basic economic theory, the rapid escalation in prices triggered by a resurgence of demand instigated a capital expenditure/supply boom. **Exhibit 3** illustrates the magnitude of the supply catch up.

Capital expenditures (as a proxy for forward supply) across a broad swath of extraction industries, after rising rapidly for many years, have flattened out. In numerous industries (gold mining, for example) the capital required to extract a given quantity of product has increased, putting further downward pressure on supply. While we cannot isolate any one metric that necessarily points to a supply rationalisation, the recent Chinese focus on the "quality" vs. the quantity of economic growth certainly sends a clear long-term signal that the Chinese period of rapid industrial growth is over, relative to

the elevated growth rates of the last 20 years, and a period of supply rationalisation is warranted as a response to de-escalating demand and the current inferior investment returns experienced by the average producer.

EXHIBIT 3: COMMODITY CAPITAL EXPENDITURES
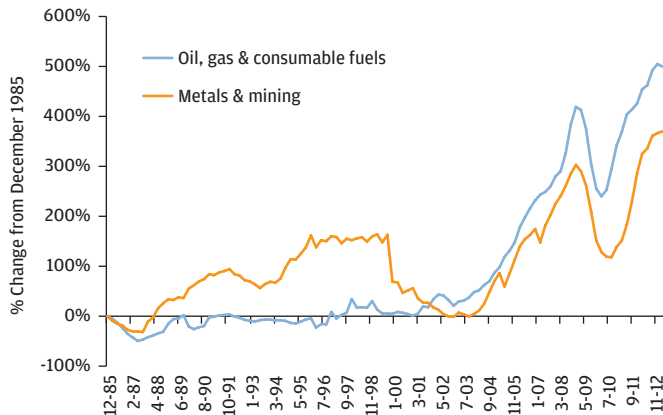
Source: J.P. Morgan, Credit Suisse, CompuStat; data to 31 March 2013, as of 23 May 2013.

Future supply may also be impacted by the increasing cost of capital and the size of project capital necessary to develop new projects, whether they are offshore deepwater energy drilling or greenfield metal projects. Less robust price signals, rising costs, the increasing size of capital requirements, heightened price volatility and other social cost considerations should put a damper on future new supply of commodities relative to the rapid supply response in the early years of the supercycle. In a 10- to 15-year term projection, however, the assumption of global growth remains the core determinant of return assuming a rational supply response to slowing demand, lower investment returns and accurate assumptions regarding capital investment risk.

A less "super" cycle going forward

Slower nominal global GDP growth, rational supply increments and increasing factor input efficiency account for the core of our commodity assumption. Other non-fundamental externalities associated with commodity usage and extraction industries such as environmental degradation and resource nationalism may drive policy in a direction that further reduces the availability of incremental supply. The slowing of demand from investment and speculative sources and other constraints upon new supply increments are impossible to quantify precisely.

The assumption of rational production based on internal rates of return and other microeconomic calculations may be overly optimistic. This may particularly be the case in the early years of the assumption time frame, since the Chinese state-owned enterprises, in particular, are considered employment, not profit, maximisers. But, in a world where slowing Chinese and global growth are well understood, incremental weights on investment returns and increased risk are likely to play a role, at least at the margin, for most producers.

On balance, our *Long-term Capital Market Return Assumptions*, based on a 5.5% nominal global growth assumption, look for real commodity returns over a 10- to 15-year horizon of approximately 1.5% and nominal returns trailing global nominal growth by 1%, producing an expected nominal diversified commodity return of 3.75% on a U.S. dollar basis.

Weight a moment! There is more to risk than volatility

by **Paul Sweeting,** *European Head, Strategy Group*
and Alexandre Christie, *Vice President, Strategy Group*

In brief

The *Long-term Capital Market Return Assumptions* have important implications for portfolio construction. We consider two important characteristics of asset class returns that investors should consider when building portfolios: the implied price of risk, and the shape of the distribution of returns—which we refer to here as the higher moments.

- Market risk, or volatility, is not the only risk of relevance to portfolio construction, so simply "plugging in" the return assumptions into a traditional mean-variance optimiser leads to highly biased portfolios.

- Even if we account for all the implied risks that can affect expected returns, portfolio construction is still based on the assumption of a normal distribution of market returns, and so may underestimate potential losses (or overestimate potential gains) if the shape of the return distribution is not normal.

- The return assumptions provide the first two moments of the shape of the return distribution for asset classes: average return and volatility. However, the third and fourth moments of the distribution—skew and kurtosis—are needed to gain a better understanding of the likely pattern of returns.

- Persistent negative skew and excess kurtosis in a number of asset classes suggests that the non-normality of market returns should be taken into account when building portfolios.

EXHIBIT 1: EXPECTED RETURNS, VOLATILITIES AND SHARPE RATIOS

Asset	Expected geometric return (%)	Expected volatility (%)	Expected Sharpe ratio
U.S. long Treasury	3.25	13.50	0.09
U.S. TIPS	4.75	6.75	0.41
U.S. investment grade corporate bonds	5.00	7.00	0.43
U.S. high yield bonds	6.00	12.75	0.31
Emerging markets sovereign debt	6.75	12.00	0.40
U.S. large cap equity	7.50	14.75	0.37
U.S. small cap equity	7.50	19.75	0.28
EAFE equity (unhedged)	7.75	18.25	0.32
Emerging market equity	9.00	24.00	0.29
U.S. private equity	8.00	22.00	0.27
U.S. REITs	6.75	20.00	0.24
Hedge funds—diversified	5.25	6.50	0.50

Source: J.P. Morgan, 2014 *Long-term Capital Market Return Assumptions*. Sharpe ratio calculated as geometric return minus cash (2%) divided by volatility. The projections in the charts above are based on J.P. Morgan Asset Management's proprietary *Long-term Capital Market Return Assumptions* (10–15 years) for risk, return and correlations between major asset classes. The resulting projections include only the benchmark return associated with the portfolio and do not include alpha from the underlying product strategies within each asset class. The assumptions are presented for illustrative purposes only. They must not be used, or relied on, to make investment decisions. The assumptions are not meant to be a representation of, nor should they be interpreted as investment recommendations. Allocations, assumptions, and expected returns are not meant to represent actual performance.

Please note all information shown is based on assumptions, therefore, exclusive reliance on these assumptions is incomplete and not advised. The individual asset class assumptions are not a promise of future performance. Note, these asset class assumptions are passive-only; they do not consider the impact of active management.

The implied price of risk

The *Long-term Capital Market Return Assumptions* are obtained using a building-block approach, as described in the methodology section of this paper on page 62. This means that while volatility is taken into account in the return assumptions, it is not necessarily the case that all asset classes will exhibit the same expected return per unit of risk–in other words, Sharpe ratios (the return net of the risk free rate, divided by the volatility) will not necessarily be equal across asset classes.

This has important implications when building portfolios. Consider for instance the expected return, the expected volatility and the expected Sharpe ratios for a sample of U.S. asset classes, shown in **Exhibit 1**. The resulting Sharpe ratios differ widely from one another, ranging from 0.09 for U.S. long Treasuries to 0.50 for diversified hedge funds. This means that the implied expected return per unit of volatility, or the price of risk, is assumed to be much greater for hedge funds than it is for U.S. Treasuries.

Beware of simply "plugging in" expected returns

This finding does not invalidate the assumptions, since these are built using a building-block approach and are entirely forward looking, rather than dogmatically assuming that the price of risk for all asset classes must be the same. However, this does mean that investors should be wary of simply "plugging in" the expected returns and volatilities into a mean-variance optimiser. Doing so produces a highly concentrated portfolio, which is shown in **Exhibit 2**.

EXHIBIT 2: ESTIMATED MEAN-VARIANCE PORTFOLIO
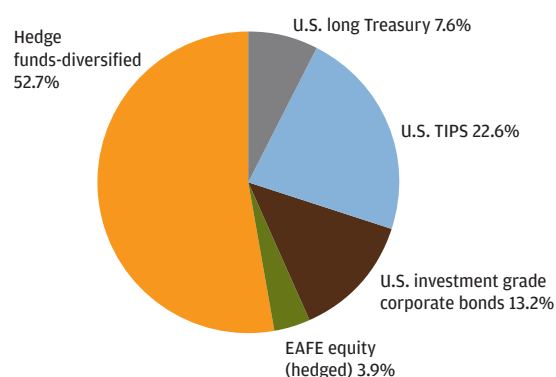
Source: J.P. Morgan calculations. For illustrative purposes only.

There are several reasons for this concentration. The optimisation relies on expected returns as though they were exactly accurate, rather than as long-term estimates. In so doing, the optimisation process ignores uncertainties in the forward-looking estimates of return. An optimisation also relies on correlation relationships among asset returns, for instance the fact that U.S. long Treasuries are negatively correlated with hedge funds. Optimisers tend to ignore other important aspects of return distributions, and only take into account volatility as a measure of risk–we shall consider both these points below.

Some investors avoid the problem of highly concentrated portfolios by imposing a maximum allocation to some asset classes, such as hedge funds. Others adopt optimisation approaches that are designed to avoid the problem of over-concentrated portfolios, such as the Black-Litterman approach or risk parity[1]. However, all these approaches to portfolio construction rely on the assumption that the only premium in returns comes from market risk. Yet market risk, or volatility, is not the only risk of relevance in portfolio construction, which is why the return per unit of risk is not the same for all asset classes.

<div style="border:1px solid orange">

Serial correlation

An important aspect of traditional mean-variance optimisation is the assumption that asset returns are independent from period to period. However, if one month's return is influenced by the previous month's return, for instance because of sticky pricing, then there may be a need to account for this effect in future asset projections. If not adjusted for in the underlying data, a procedure sometimes referred to as unsmoothing, serial correlation can mask true asset class volatility and can lead to underestimation of overall portfolio risk. The volatilities reported in the *Long-term Capital Market Return Assumptions* are based on unsmoothed historical returns—for further details on this process, please see the methodology section of this paper on page 62.

</div>

The relationship between expected returns and volatilities

One of the reasons why asset classes do not all exhibit the same return per unit of volatility is that the building-block approach to the return assumptions suggests a premium for some assets over others. To a large extent, this is to account for illiquidity. To find out more, we built a model of the relationship between expected returns and volatilities to find out whether there was a greater implied premium for some asset classes over others. Our procedure involved three stages:

1. Using data on liquid asset classes spanning 20 years of monthly returns, we built a model of the relationship between expected returns and volatilities, which are derived taking into account the historical covariance between asset class returns.

2. Using this relationship, we estimated the expected return on illiquid asset classes, using the unsmoothed volatility of the illiquid asset classes.

3. We then compared the estimated returns from our model with the expected returns published in the *Long-term Capital Market Return Assumptions*. This difference is the effective premium implied by the assumptions.

The 46 U.S. dollar-denominated asset classes included in the *Long-term Capital Market Return Assumptions* were included in the analysis to derive the implied premiums. A summary of the highest premiums is shown in **Exhibit 3**[2].

[1] For further information on these approaches, see "Diversification—still the only free lunch?" and "Improving on risk parity: Hedging forecast uncertainty", J.P. Morgan Asset Management.

These results show several aspects of the implied risk and return trade-off of the assumptions. First, alternative asset classes—including infrastructure and hedge funds—exhibit premiums over the estimated returns. This is likely partly due to an implied illiquidity premium for these asset classes. Commodities and gold exhibit the highest premiums—the reasons for this are explained in the article starting on page 26.

Second, a premium is also apparent for emerging market local currency sovereign debt, which reflects the development of monetary policy in emerging market countries and a relatively favourable outlook for inflation that is helping local markets exceed expected returns.

Perhaps most remarkably, U.S. long Treasuries exhibit a relatively high premium of 2.73%. This is likely to be caused by leverage avoidance: during periods of low yields, investors invest more heavily in equities to achieve return targets without taking on leverage, thereby reducing equity returns more than would otherwise have been expected and leading to higher-than-expected total returns on government bonds.

In any case, it is the existence of these implied premiums which differentiates this forward looking exercise from a purely mechanical approach in which the return per unit of risk is assumed to be equal for each asset class.

EXHIBIT 3: SUMMARY OF IMPLIED PREMIUMS

Asset	Expected volatility	Expected return	Implied premium
Commodities	18.50%	3.75%	3.53%
Gold	19.00%	4.25%	3.16%
US Long Treasury	13.50%	3.25%	2.73%
Global Infrastructure	12.50%	7.25%	1.53%
EAFE Equity	14.50%	7.75%	1.51%
Hedge Fund-Event Driven	8.00%	6.00%	1.45%
World ex-U.S. Government Bond	8.25%	3.25%	1.36%
Emerging Markets Local Currency Sovereign Debt	12.25%	7.00%	1.35%

Source: J.P. Morgan Asset Management calculations. The implied premium is the difference between the return generated by the model and the expected return in the *Long-term Capital Market Return Assumptions*. Regression equation and individual parameters are significant at 1%. For illustrative purposes only.

[2] It is important to note that this approach does not take into account the diversification effect of covariances between asset class returns. This is because the inclusion of covariances in the model would have had to be in relation to a particular market portfolio, and any results obtained would have been sensitive to our choice of market portfolio.

Skew and kurtosis: Hidden measures of risk

Even if we account for the implied premiums in expected returns, the discussion above still makes the assumption of a normal distribution of market returns. Yet the shape of the return distribution of asset classes is important, and it may not necessarily be normal. The distribution of returns for any given asset class provides a way of assessing the frequency with which each return is likely to occur in the future.

The *Long-term Capital Market Return Assumptions* generate two figures for each asset class: the expected return and the volatility. These correspond to the first two moments of the distribution of returns: the expected average return, and the corresponding standard deviation. To gain a fuller understanding of the distribution of returns, however, it is important to also consider the third and fourth moments of the distribution, known as the skew and the kurtosis, respectively.

> ## What are moments?
>
> Every probability distribution exhibits "moments," each of which describes an aspect of the shape of the probability distribution. The most commonly employed moments are the mean (which is the first moment) and the standard deviation (which is the second moment). The third moment, known as the skew, describes the extent to which the distribution may be leaning to one side or the other, while the fourth moment, known as kurtosis, describes its "peakiness" (whether it is tall or squat).

Looking at the shape of the distribution

The shape of the probability distribution of market returns is important because it has implications for downside risk, or potential loss. The normal distribution is often assumed because of its simplicity: indeed, to build a portfolio using a traditional framework, investors need only make two assumptions for each asset class–its expected return and volatility–as well as one assumption for each pair of asset classes: their covariance.

In reality, however, some asset classes exhibit distributions that are not normal. An illustration of this phenomenon is shown in **Exhibit 4**, which shows the normal distribution as well as the empirically observed distribution of returns for emerging market equities.

EXHIBIT 4: DISTRIBUTION OF EMERGING MARKETS EQUITY RETURNS
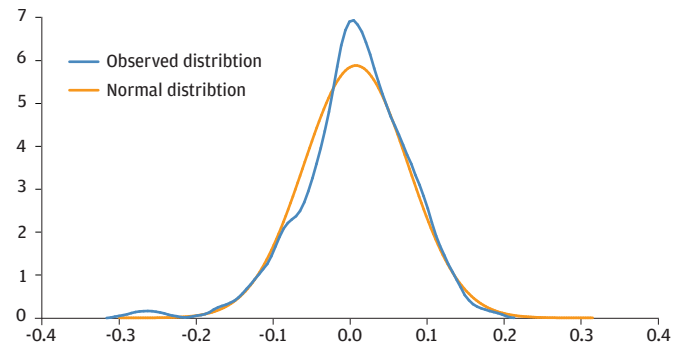
Source: J.P. Morgan calculations. For illustrative purposes only.

Exhibit 4 shows that the two lines do not coincide. The observed distribution (depicted in blue) lies above the normal distribution (depicted in orange) in several places. This has a direct consequence for a portfolio that has been built using expected returns and volatility alone. This is because the frequency of large losses is underestimated by the normal distribution, so portfolios built on the assumption of normality will tend to underestimate potential losses.

The first moment of the distribution, which is the expected return, may be interpreted as the expected mean of the distribution. Volatility, which is the second moment, is the standard deviation of return about the mean.

The third moment, skew, may be interpreted as a measure of symmetry, or the extent to which a distribution leans to one side or the other. A zero skew implies that the distribution is symmetrical, whereas a negative (positive) skew implies that the distribution exhibits a so-called "fat left tail" ("fat right tail"). A negative skew is apparent in **Exhibit 4**: on the bottom left hand corner, the blue line lies above the red line, implying a high probability of negative returns. Skew is an important measure because if it is assumed to be zero, as is the case in the normal distribution, large negative returns are assumed to be just as likely as large positive returns. This is not the case for many asset classes.

Kurtosis is the fourth moment: it refers to the degree of peak of the distribution. The higher the kurtosis, the higher the peak in the distribution and the greater the chance of extreme returns (either extremely positive or extremely negative). In other words, high kurtosis is suggestive of a tall and peaky distribution, as is the case in **Exhibit 4**, whereas a low kurtosis indicates a short distribution. Kurtosis is important because, as for skew, the standard assumption of a normal distribution may cause an investor to underestimate the likelihood of large negative as well as large positive returns.

Exhibit 5 shows the skew of the returns of a sample of U.S. dollar-denominated asset classes over a period of 20 years.

EXHIBIT 5: SKEW
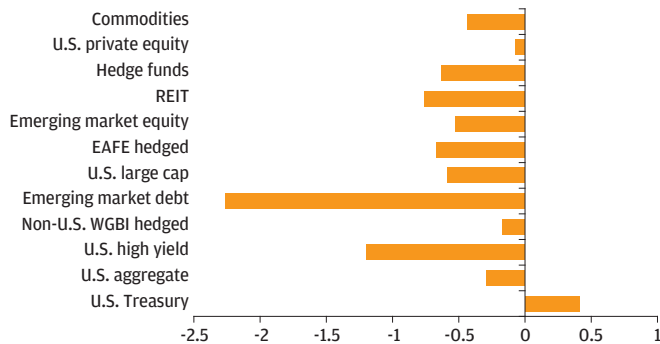
Source: J.P. Morgan calculations. For illustrative purposes only. Monthly data covers the 20-year period to September 2012.

Exhibit 5 shows that all but one asset class in the sample appear to exhibit a negative skew, which suggests that the distribution of returns of these asset classes tends to be characterised by "fat left tails"—in other words, the probability of large losses is underestimated by the use of a normal distribution. The extent to which the skew appears to be negative varies across asset classes, but it appears most pronounced in the case of emerging market debt. U.S. Treasuries, meanwhile, appear to exhibit a positive skew.

Measuring excess kurtosis

Exhibit 6 depicts the apparent excess kurtosis of each asset class in the sample. The measure of excess kurtosis indicates the extent to which kurtosis exceeds that of a normal distribution. It is apparent that all asset classes appear to exhibit higher kurtosis than would be expected under the hypothesis of normally distributed returns. This is particularly so, once again, for emerging market debt.

EXHIBIT 6: KURTOSIS
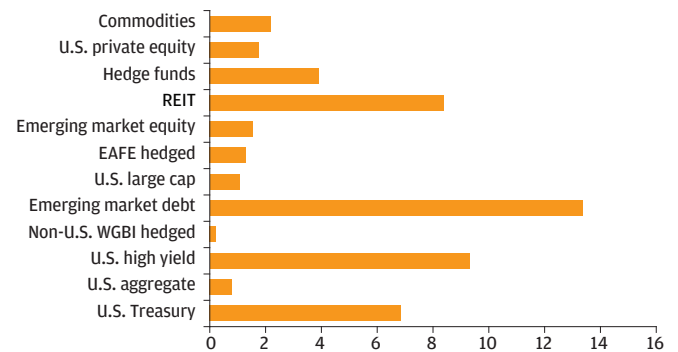
Source: J.P. Morgan calculations. For illustrative purposes only. Monthly data covers the 20-year period to September 2012.

The skew and the kurtosis are measured using the historical returns of an asset class, and they therefore depend on the time period over which they are measured: here we employed the last 20 years of historical returns, but a different result would have been achieved if we had taken the previous 20 years, or the last 10 years. To determine whether an asset class exhibits normally distributed returns, it is therefore useful to measure the extent to which skew and kurtosis change when selecting different returns data.

One approach is to measure the extent to which skew and kurtosis change over time. **Exhibits 7, 8** and **9** depict the rolling measure of skew for fixed income asset classes, equities and alternatives, respectively. **Exhibits 10, 11** and **12** show the corresponding charts for kurtosis.

EXHIBIT 7: ROLLING SKEW OF FIXED INCOME ASSET CLASSES

Source: J.P. Morgan calculations. For illustrative purposes only.

EXHIBIT 8: ROLLING SKEW OF EQUITIES

Source: J.P. Morgan calculations. For illustrative purposes only.

EXHIBIT 9: ROLLING SKEW OF ALTERNATIVES
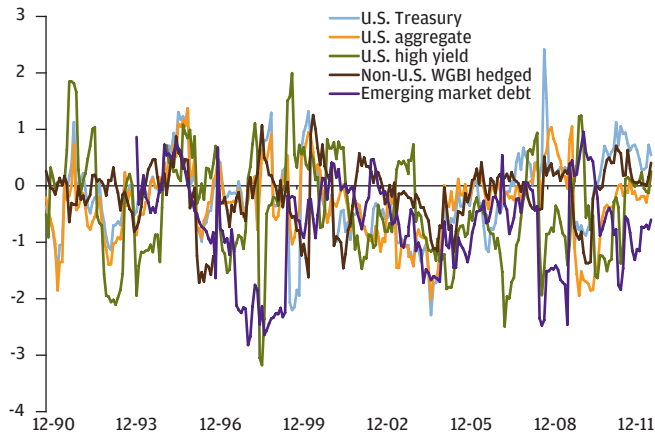
Source: J.P. Morgan calculations. For illustrative purposes only.

EXHIBIT 10: ROLLING KURTOSIS OF FIXED INCOME ASSET CLASSES
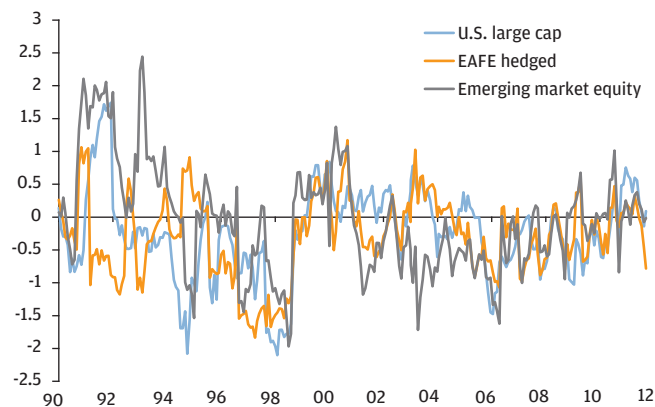
Source: J.P. Morgan calculations. For illustrative purposes only.

EXHIBIT 11: ROLLING KURTOSIS OF EQUITIES
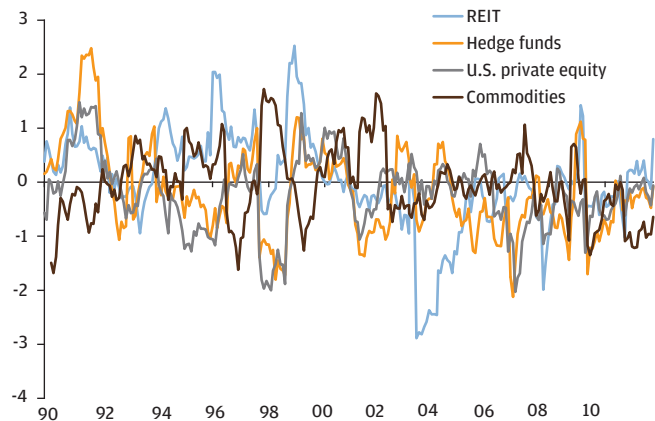
Source: J.P. Morgan calculations. For illustrative purposes only.

EXHIBIT 12: ROLLING KURTOSIS OF ALTERNATIVES
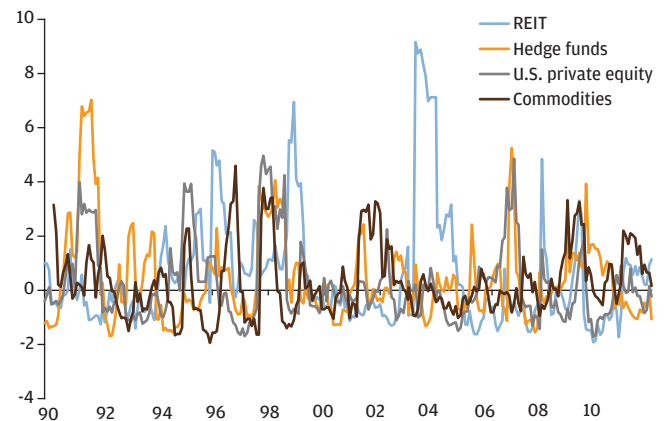
Source: J.P. Morgan calculations. For illustrative purposes only.

Identifying the stability of skew and kurtosis

No clear pattern emerges from the rolling skew and kurtosis diagrams, which might suggest that the figures found over the last 20 years of data may not be reliable indicators of their stability over the following 20 years.

There is, however, a more robust way of identifying the stability of skew and kurtosis, which is often referred to as bootstrapping. Therefore, for each asset class, we applied the following procedure to measure the dispersion of skew and kurtosis:

1. We selected a random sample of 120 historical monthly returns.

2. We calculated the skew/kurtosis of the selected sample of returns.

3. We repeated this procedure 100 times.

4. From these results, we first calculated the average skew/kurtosis, and then we worked out the fifth and ninety-fifth percentiles in order to provide an estimate of the dispersion of the results.

Exhibit 13 shows the results for the analysis of skew. For each asset class, the square represents the average skew. A skew above zero is suggestive of a left-leaning distribution of returns. In contrast, a skew below zero is suggestive of a right-leaning distribution. On this basis, it is apparent that the average skew is mostly negative for most asset classes, except for U.S. Treasuries, where the average skew lies slightly above zero.

The vertical bars indicate how much confidence we can have in this result. They do this by showing the difference between the fifth and the ninety-fifth percentiles, which is a measure of how widely the measures of skew differ across random samples. On this basis it is clear that only aggregate bonds, emerging market debt, U.S. equities, EAFE equities, emerging market equities and commodities appear to have significantly negative skew—these are shown in orange.

EXHIBIT 13: MEASURES OF SKEW
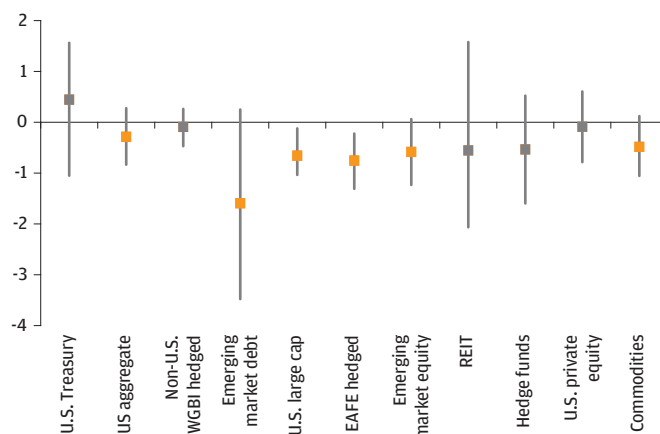
Source: J.P. Morgan calculations. For illustrative purposes only.

Exhibit 14 shows the results of the analysis of kurtosis. The squares depict the average excess kurtosis. As mentioned previously, this is the extent to which kurtosis exceeds that of a normal distribution. This means that any point above zero indicates higher kurtosis than is implied by a normal distribution, while a point below zero indicates a lower kurtosis. By construction, this measure cannot fall below -2, but it is apparent that all the asset classes featured exhibit a kurtosis that is significantly above the level implied by the normal distribution.

EXHIBIT 14: MEASURES OF KURTOSIS
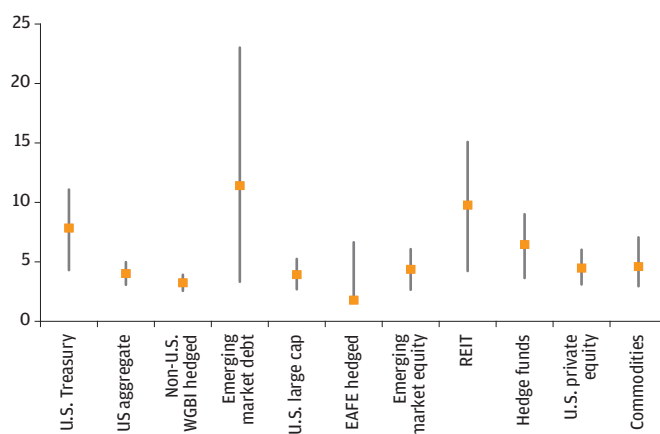
Source: J.P. Morgan calculations. For illustrative purposes only.

Exhibit 13 and Exhibit 14 show that a number of asset classes exhibit persistent skew and excess kurtosis, which suggests that the assumption of a normal distribution is inappropriate in these cases. For other asset classes, however, the evidence is unstable. In these cases, the assumption of a normal distribution may be preferable, since any alternative would require an assumption on the shape of the returns distribution, which may change over time.

Conclusion: Moving towards more effective portfolio construction

The analysis of excess return, and of skew and kurtosis, suggests that relying on expected returns and volatilities for portfolio construction is necessary, but not sufficient.

Market risk is not the only risk of relevance to portfolio construction, and relying on Sharpe ratios alone can lead to heavily concentrated portfolios. Meanwhile, the incidence of persistent skew and kurtosis in a number of asset classes is suggestive that the non-normality of market returns should be taken into account when building portfolios.

There are several approaches that allow uncertainty and potential loss to be taken into account—two of them are described in the following J.P. Morgan Asset Management papers:

• The non-normality of market returns

• Improving on risk parity: Hedging forecast uncertainty

II. Long-term capital market return assumptions

America leads the way

by Michael Hood, *Global Markets Strategist, Institutional Business*

In brief

The macroeconomic projections behind the 2014 edition of the *Long-term Capital Market Return Assumptions* foresee slightly higher medium-term growth in the U.S. and slightly less growth across the emerging world, including China, than was the case in last year's version.

- Little change has occurred in the developed economy forecasts, though we now feel somewhat more optimistic about the growth path in the U.S.

- Slowing cross-border trade, weaker growth in commodity prices and several country-specific issues have caused us to reduce our aggregate annual emerging market growth forecast by about half a percentage point.

- Inflation rates will likely track central bank targets in most of the developed world while remaining fairly close to their recent levels in emerging economies.

- Thus far, highly expansionary monetary stances have shown little sign of creating medium-term inflation pressures.

- The *Long-term Capital Market Return Assumptions* expect that policy tightening will occur in a timely fashion, preventing the build up of dangerous imbalances.

Estimating GDP

In estimating long-term real GDP growth rates for the 17 countries in our sample (four "core" economies, four other developed market and nine emerging market representatives), we generally abstract from current cyclical considerations—such as how much slack exists in the economy, or how close a country is to the end of an expansion. We focus on potential, or trend, GDP: essentially, the growth rate of an economy's productive capacity over time or, in other words, the pace of expansion that an economy can sustain without generating significant upward inflationary pressure.

In standard growth-accounting frameworks, the trend rate comes from two sources. First, an economy adds resources, primarily as population growth and investment boosts the workforce and increases capital. Second, capacity grows over time because of a set of other forces. A residual, known as total factor productivity (TFP), reflects technological change and factors such as changing methods of industrial organisation.

Economic forecasts

For the OECD (Organisation for Economic Co-operation and Development) economies we cover, we assume that potential GDP growth rates as estimated today will change little over our forecast horizon. Demographic trends, after all, move slowly, and capital accumulation (investment) rates do not fluctuate significantly in these economies. Moreover, developed economies are operating at or very close to the technological frontier, and their TFP growth rates will depend primarily on the pace of global technological change, accelerations or slowdowns of which are nearly impossible to predict.

The forecast process in emerging markets, though, differs slightly. The rapid growth of these countries owes partly to convergence, as they move towards the technology frontier. This gap-closing tends to occur more quickly at lower income levels, while growth rates slow as countries develop. Some of our emerging market forecasts, then, consist of "averages" between high present clips and milder expansions expected a few years down the road.

U.S. growth outlook has improved

The one country for which we pencil in a higher medium-term growth rate this year than last, the U.S., represents a slight exception to our potential growth rule. We continue to believe that the U.S. will experience a potential growth rate in coming years of around 2.25%. The U.S. economy, however, currently appears to be operating with a great deal of slack, as evidenced by the very low employment-to-population ratio. That spare capacity, which may mean the U.S. economy is operating 3%-4% below its potential level, has been evident for some time. But post-recession healing has now progressed significantly in important parts of the economy, exemplified by the housing sector. And the remarkable improvement in household balance sheets makes the economy less vulnerable to consumer retrenchment than has been the case until recently (see **Exhibit 1**).

Deleveraging will continue but no longer appears to require highly cautious private sector behaviour. Even this year's modest growth provides some encouragement, given it has occurred against the backdrop of a severe fiscal tightening that has likely subtracted around two percentage points from headline growth. For these reasons, we have become more confident that the U.S. will make use of currently idle resources in coming years, growing for a period of time faster than the underlying trend rate and returning to full capacity. We therefore have lifted our U.S. growth expectation to 2.50% per annum.

EXHIBIT 1: U.S. HOUSEHOLD NET WORTH, SHARE OF DISPOSABLE INCOME (%)
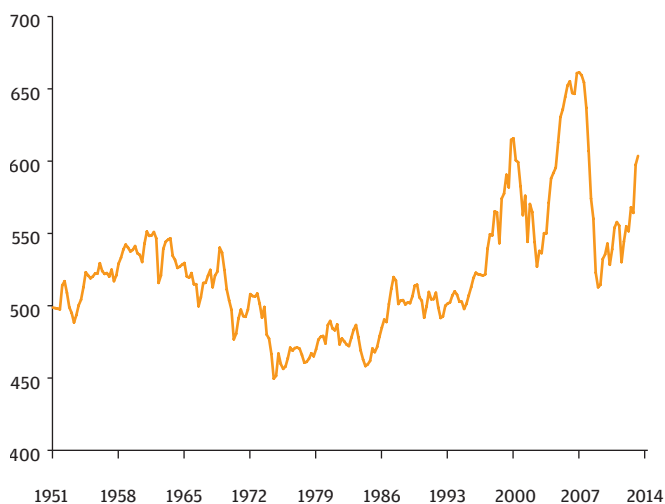
Source: Federal Reserve Board; data as of 30 June 2013

No change in outlook for Europe and Japan

Elsewhere in the developed world, our growth numbers have not changed from last year. We project 1.5% growth in the eurozone and 2% in the UK. Like the U.S., both of these economies appear to be running well shy of full capacity. The eurozone, however, still requires considerable restructuring and suffers from ongoing uncertainty about the region's political ability to construct the institutions necessary for sustainable monetary union. Weak eurozone growth represents a persistent drag on the UK economy, which is also dealing with the long-run shrinkage of its large financial sector. We feel less comfortable about forecasting periods of "catch-up" growth in these two economies than we do for the U.S.

The Japanese government, meanwhile, has laid out an explicit structural reform strategy to promote growth, but we have left our expectation at a modest 1% per annum. We believe that demographic headwinds, rather than inefficient resource use, have represented the major drag on Japanese growth in recent years and we are therefore not convinced that the government's initiatives will do much to boost TFP. The large stimulus measures are more likely to affect nominal variables (such as inflation) than the real economy.

While developed market governments have carried out a significant portion of the fiscal adjustment required after the 2009 recession and related stimulus, public sector deleveraging will form part of the landscape in developed economies for some years to come. In most cases, notably the eurozone and the U.S., fiscal thrust will turn less negative from here than has been the case in the past two years.

Our projections assume that a combination of further gradual improvement in budget balances and somewhat faster growth will allow public debt ratios to stabilise, albeit at high levels by historical standards. Still, austerity fatigue poses some risk to this expectation. In parts of the eurozone, additional debt restructuring might become necessary, either through an explicit burden-sharing mechanism or through debt stock writedowns.

Emerging markets face a less friendly global environment

Emerging economies have endured a difficult period since 2011. While rapid by developed market standards, emerging market growth rates have run well below expectations. To some extent, this weakness reflects sluggishness in the developed world, as emerging market growth remains highly synchronised with developed market trends. Deeper factors are also at work, however. As the emerging countries grow richer, their pace of convergence with developed economy standards is naturally slowing.

The world itself looks less friendly to emerging markets than was the case in the mid 2000s. Cross-border trade volumes are rising more slowly, as the globalisation process has essentially run its course. Commodity prices are no longer rising secularly and generating the income boost enjoyed by emerging economies in recent years. And several major emerging markets are grappling with specific problems. For example, private sector investment has weakened significantly in both Brazil and India, in response to government policies that are perceived to be hostile. As a result, our aggregate annual emerging market growth forecast has fallen by about half a percentage point.

Most importantly, we now expect 6.5% real GDP growth on average in China during the forecast period, down from 7.5% per annum a year ago. China's potential growth rate appears to have slowed sharply since 2009. Over the past two years, the economy has been growing at roughly 7.4% per annum, vs. 10.7% in the prior decade. Inflation has declined only modestly of late, suggesting that current trend growth is not much, if at all, above the Chinese economy's actual recent pace.

Several factors have likely contributed to China's lower growth trajectory. Among the most important has been a decline in investment efficiency after years of very heavy capital spending that may have boosted capacity too much in some sectors. The workforce is also expanding more slowly than in the past and may in fact contract in coming years. Finally, China has experienced a large-scale credit cycle in the past decade that has pushed private sector leverage to a high level by international standards. Financial deepening will likely proceed at a much more gradual pace from here.

A possible template for China's future growth

The historical experience of Korea and Taiwan, fairly similar economies in the same part of the world, provides one possible template for China's future. Thus far, China has been following roughly in their footsteps. Last year, China hit the USD 6,000 mark for per capita GDP, a stage of development reached by Taiwan in 1988 and Korea in 1990. In the 10 subsequent years, Taiwan grew 6.8% on average (in real terms) and Korea 6.5%. Our forecast, then, expects China to remain on a similar path.

Achieving this projection will likely depend on the Chinese authorities carrying through on some of the objectives they have recently outlined, such as opening up the financial system, focusing more on concentrated urban growth instead of facilitating the current pattern of sprawl, and cutting back on inefficient infrastructure investment. With its still-low income level, China can grow rapidly for some time to come as it converges with the developed world. That expansion, however, will need to come from TFP gains as it moves toward the technology frontier, rather than through large-scale resource accumulation, as has been the pattern until now.

Inflation forecasts

The consumer price index (CPI) forecasts in the *Long-term Capital Market Return Assumptions* rest on one major belief: that very accommodative monetary policy stances throughout the developed world will not spark large increases in inflation down the road. This view has not changed since last year. At the margin, though, our conviction in this call has improved, for four reasons:

- First, actual inflation has drifted lower, albeit modestly. Perhaps counterintuitively, we take comfort from the fact that developed market inflation has remained in positive territory throughout the current expansion despite significant spare capacity. This surprising resilience to some extent reflects nominal rigidities, in particular the rarity of outright wage declines, but it also speaks to the increasingly well-anchored nature of inflation expectations in recent years. Expectations appear to be limiting inflation declines from the high side at the moment, and in coming years they will likely continue to serve as a gravitational pull that limits inflation acceleration.

- Second, both surveys and market pricing reinforce the idea that inflation expectations are holding steady. Even after several years of extraordinary monetary stimulus, markets, households and businesses are not projecting medium-term deterioration in the inflation environment.

- Third, the Federal Reserve has demonstrated this year its willingness to reduce monetary accommodation in a timely fashion, displaying a high degree of sensitivity to business cycle developments.

- Fourth, improving fiscal positions, while not yet sufficient to put government debt burdens on sustainable paths in all countries, reduce the risk that high inflation will eventually be required to liquidate these obligations.

Positive gap in developed markets between core and headline CPI has closed

In the developed world, we have made one across-the-board change to our inflation expectations. While mostly leaving core CPI projections unchanged, we have closed the positive gap we previously showed between overall and core inflation. That wedge reflected a view that commodity prices would rise in relative terms (that is, compared with manufactured goods and services prices), causing headline inflation rates to run above core, as occurred through much of the previous decade.

Last year, in response to the changing commodity price environment, we narrowed the previously shown gap, to 0.25 percentage points in most cases. This year, we remove it entirely. We expect commodities to evolve similarly to other prices in coming years, in an atmosphere of generally subdued growth, less commodity intensity of growth than was the case in the 2000s, and loosening supply constraints (in particular for energy but also for some minerals).

Higher expectations for Japanese inflation

We have raised our core inflation forecast for Japan, putting it in positive territory at 0.75%. The Bank of Japan (BoJ), which previously argued that deflation was mostly a demographic and growth-related phenomenon, has (under new management) shifted its tone. It has begun attacking deflation with large-scale monetary expansion. We share the new diagnosis—that deflation has owed in large part to insufficient monetary support—and expect the BoJ to prove successful over the medium term. We doubt, however, that it will soon achieve 2% inflation—a pace not consistently observed in Japan since the start of the 1990s.

Japanese inflation expectations appear to move quite slowly. Our projection thus incorporates continued mild price declines in the near term and a gradual rise to an eventual inflation rate around 1% later in the forecast horizon. The risk to our expectation probably lies on the high side, especially if near-term stimulus produces persistently rapid growth without corresponding improvement in the economy's potential rate, as Japan seems to be operating with less spare capacity than is the case elsewhere in the developed world.

Inflation to remain in line with policy goals in the U.S and Europe

For both the U.S. and the eurozone, we expect inflation to hug central bank targets. In the U.S, the Federal Reserve aims for 2% inflation, targeting not the CPI but an alternative measure, the personal consumption expenditure (PCE) deflator. Core CPI inflation tends to run slightly above core PCE price increases, and we therefore pencil in a 2.25% projection for the former index.

In the eurozone, inflation seems unlikely to move significantly above the European Central Bank's 2% ceiling for some time to come, although a period of faster increases would likely facilitate the region's necessary rebalancing (by allowing for relative price changes in which inflation would run higher in the core economies than in the periphery, without requiring deflation in the latter). As in the U.S., European inflation has proven surprisingly resilient, remaining solidly positive despite a very high unemployment rate and a second recession in the space of five years.

Our UK inflation forecast represents a partial outlier. We project 2.5% inflation, above the Bank of England's (BoE's) 2% target. This is based on our perception that the BoE is likely to prove more tolerant of a temporary mild overshoot than its counterparts elsewhere, as well as on a view that sterling may depreciate in order to support UK competitiveness as the country's financial sector restructures.

Emerging market central banks remain focused on inflation outcomes

Our emerging market inflation projections have not changed from last year. For the most part, we expect inflation in line with stated or implicit policy goals. Very few emerging market central banks have eased aggressively over the past two years when growth has been weak, instead focusing on inflation outcomes. For Russia (5.5%) and Turkey (6.0%), our forecasts lie above what the authorities would probably like to achieve over the medium term. Neither the Russian nor the Turkish central bank, however, has yet achieved the kind of long-run credibility that would facilitate significant inflation declines without putting meaningful downward pressure on economic activity.

The greatest adventure

by **Michael Feser, CFA,** *Global Investment Director and Portfolio Manager, Asset Management Solutions Group* and **Grace Koo, PhD,** *U.S. Head of Research and Portfolio Manager, Asset Management Solutions Group*

In brief

Policy rates are set to remain low for the next two-to-three years, followed by a long and slow process of adjustment to equilibrium levels.

- U.S. and UK government bond yields will remain broadly stable for another two years, before rising back to equilibrium levels.

- We expect the policy rate normalisation process for the eurozone and Japan to begin a year later than in the U.S., and the overall adjustment period to be longer as well.

- Investment grade and high yield credit spreads will be supported by limited excess credit build up, strong investor demand for income and yield, and narrower credit quality differentials.

- Emerging market local currency equilibrium yields will rise, as a combination of higher inflation tolerance, extending market duration and rising demand for higher real yields more than offsets convergence of liquidity and credit-related spreads.

A very long journey back to normal

Despite the tangible progress made this year we still see developed economies operating with substantial slack. Growth is modest in the U.S. and is gradually awakening in the euro-zone, while realised inflation is falling and inflation expectations remain well anchored. Major central banks are therefore likely to keep policy rates at the current low level for at least another two-to-three years, anchoring the extent to which bond yields will be able to rise in the near term.

As labour resource utilisation finally rises to more acceptable levels, policy rates are expected to rise—albeit very slowly—beginning their journey to "equilibrium" levels only in 2016-2017 (**Exhibit 1**). Our expectation for a return to a normal yield environment is unchanged compared to last year's assumptions, but our equilibrium cash yield assumptions remain below the levels historically considered normal.

EXHIBIT 1: CASH RATE ASSUMPTIONS

Cash rate (%)
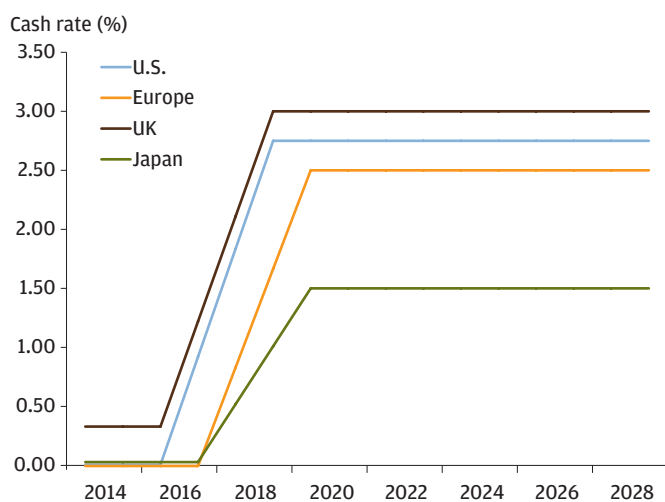
Source: J.P. Morgan; data as of 30 September 2013.

The combination of a long period of accommodative central bank policy with continued investor demand for safe assets will lead to small negative real cash returns in most markets, with cash returns 25-50 basis points (bps) below headline inflation.

We continue to believe yield curves are likely to flatten globally, especially in the long-to-ultra long end, as an ageing population and the growth of liability-driven investments increase the demand for long duration securities. The need for income producing assets and a smaller credit quality differential between

sovereign and corporate credit ratings should lead to lower equilibrium spread levels for investment grade and high yield bonds than have historically been the case.

Credit loss rates will remain below their historical average for an extended period, as regulatory change and the still fresh memory of the global financial crisis of 2008-09 helps to maintain underwriting discipline and the current long-term structure of debt stock reduces rollover risks.

U.S.: A step ahead on the path to equilibrium

Cash and bond yields in the U.S. are expected to be broadly stable for the next two years. We then expect a three-year adjustment period for cash yields as they rise to an equilibrium level of 2.75%, and a one-and-a-half year adjustment period for 10-year Treasuries as they rise to an equilibrium level of 4.75%. We therefore continue to expect cash and bond rates to reach their equilibrium level by the end of 2018, the same as last year, but note that cash yields will remain substantially below historical levels of neutrality.

Although the equilibrium cash yield assumption is 50 bps above expected headline inflation, the initial long period of accommodative Federal Reserve policy results in an expected real cash return of -25 bps. Fixed income market returns will struggle as yields rise to equilibrium levels, but they will benefit from the higher starting yield compared to last year and the significant roll-down from the steep yield curve. In combination this leads us to expect a U.S. 10-year Treasury bond return of 4.50% annually over the assumptions horizon.

As in prior years we maintain the view that the yield curve between cash and 10-year U.S. Treasuries will be slightly steeper than in the past. This reflects an ongoing inflation bias and also incorporates Japan's experience following an extended period of zero interest rates. On the other hand, we expect structural demand factors to flatten the long end of the yield curve, between 10-year and 30-year maturities, to 25 bps in equilibrium.

For corporate credit markets, we continue to expect relatively tighter spreads compared to long-run historical observations for investment grade and high yield bonds, broadly unchanged from last year's *Long-term Capital Market Return Assumptions*.

Limited excess credit build up, sustained strong investor demand for income and yield, as well as narrower credit quality differentials, are all supportive for credit spreads. Our expectation of equilibrium investment grade corporate credit spreads therefore remains unchanged at 125 bps.

Continued investor appetite for high yield assets lets us keep the average net premium required to hold high yield bonds at 275 bps, after adjusting for an expected credit loss of 200 bps based on an average default rate of 3.0% to 3.5% and recovery rates of around 40%. In combination, these two drivers lead to an equilibrium high yield spread of 475 bps compared to the historical average of 550 bps. The corresponding return forecasts for U.S. investment grade corporate bonds and high yield bonds are 5.00% and 6.00% respectively.

Eurozone: A longer winding path to equilibrium

The European Central Bank (ECB) continues to signal its willingness to maintain an accommodative stance. In particular, the ECB continues to help to improve credit conditions in the eurozone periphery, which is most adversely affected by the fragmentation of financial markets in the region. Along with the gradual recovery of eurozone growth dynamics, we continue to expect a slower onset of the rate normalisation cycle than in the U.S.

We expect eurozone rates to be anchored until the end of 2016, followed by a long adjustment period of three years to the equilibrium level, which will be below the equilibrium level of prior cycles. Cash returns will consequently be lacklustre in the eurozone in the near term, but will reach the equilibrium level of 2.50% in the long run, which is 50 bps above headline inflation.

For euro government bonds[1], we lower our assumption for the 10-year equilibrium yield to 4.00%. This reflects, in part, a reduced level of credit differentiation among eurozone sovereign issuers, but more importantly it reflects a longer period of relatively subpar growth. The outlook for European corporate credit remains similar to that of the U.S., with investment grade credit spreads of 125 bps and a comparatively slightly wider high yield spread of 500 bps, reflecting the lower liquidity of European high yield bonds.

[1] As in prior years we assume the euro common currency area to remain intact and Spain and Italy to continue to be among its members.

UK: Normalising at U.S. speeds

For the UK, we assume that the path to normalisation will be similar to that in the U.S. Cash yields will initially remain unchanged for two years, followed by an adjustment period of three years as they rise to an equilibrium yield of 3.00%–50 bps ahead of headline inflation at 2.50%.

For UK government bonds, we lower our forecast for the 10-year equilibrium Gilt yield of 4.75%. With returns adversely affected by the required rise toward equilibrium levels, a 3.75% annualised return is expected over the horizon of the *Long-term Capital Market Return Assumptions*.

Japan: The road less travelled

For Japan, the normalisation path is expected to be similar to that of the eurozone. The long-term prospects for Japan, however, are considerably more uncertain than in prior years. We currently assume Abenomics to be at least somewhat successful in stimulating growth and ending deflation, but the increasing demographic pressures and high public debt burden limit our enthusiasm. Domestic savings will continue to support relatively low real rates, and we therefore assume only a moderate rise of cash and 10-year bond yields to 1.50% and 2.50%, respectively.

Emerging markets: An evolving universe

For hard currency emerging market sovereign debt, we continue to believe the credit quality of the market as captured by the benchmark has reached a plateau. Higher quality issuers will either struggle to improve their credit rating further or, where successful hand-in-hand, continue to focus on developing and issuing in their local currency markets. Lower-rated frontier markets will only grow their issuance of external debt slowly. Therefore, despite the current cyclical slowdown and the need for structural reform and economic rebalancing in some economies, we keep the long-run equilibrium spread unchanged from last year at 250 bps over U.S. Treasuries.

More broadly we do not believe that the conditions are in place today for a repeat of a 1998-type crisis. We therefore do not expect a large jump in corporate credit downgrades or defaults, and we believe that the composition of the hard currency emerging market corporate bond market, in terms of investment grade and high yield issuers, is broadly in equilibrium. While shorter in duration, the emerging market corporate sector has, however, more cyclical sensitivity, and its average issuance size is much smaller than that of emerging market sovereign debt. Therefore, we anticipate corporate bonds will trade at a relative discount to hard currency emerging market sovereign bonds, with an expected equilibrium spread of 300 bps over U.S. Treasuries, unchanged from last year.

While composition changes in the index over time may have a very meaningful impact, we expect equilibrium yields for local currency emerging market debt to rise to 7.25% over the horizon of the *Long-term Capital Market Return Assumptions*. A combination of higher inflation tolerance, extending market duration and rising demand for higher real yields as domestic savings rates fall is likely to more than offset further convergence of liquidity and credit-related spreads.

Although not currently contemplated or incorporated in our forecasts, the opening of local markets in Brazil, India and Russia would push the equilibrium yield higher, while a significant increase of Chinese local bond issuance would have the opposite effect.

EXHIBIT 2: FIXED INCOME SELECTED LONG-TERM EQUILIBRIUM RETURN ASSUMPTIONS

Government-compound 10-15 year returns (local)

	Yields (%)	Returns (%)
U.S. core inflation	2.25	
U.S. cash	2.75	2.00
U.S. 10-year Treasury	4.75	4.50
U.S. TIPS (real yield)	1.50	4.75
U.S. municipal (1-15 blend)	3.25	3.75
European core inflation	2.00	
European cash	2.50	1.50
European 10-year government bond	4.00	3.00
UK core inflation	2.50	
UK cash	3.00	2.00
UK 10-year government bond	4.75	4.25
Japan core inflation	0.75	
Japan cash	1.50	0.75
Japan 10-year JGB	2.50	1.25

Credit-compound 10-15 year returns (local)

	Spread (bps)	Returns (%)
U.S. corporate bonds	125	5.00
U.S. high yield bonds	475	6.00
European investment grade corporate bonds	125	3.25
Pan-european high yield bonds	500	5.25
Emerging market debt	250	6.75
Local sovereign EM debt	7.25%*	7.00
Corporate EM debt	325	6.25

Source: J.P. Morgan Asset Management. Estimates as of 30 September 2013. Equilibrium fixed income yields have been rounded to the nearest 25 bps.

* Equilibrium yield estimate

Putting a price on normalisation

by **Patrik Schöwitz,** *Global Strategist, Asset Management Solutions Group*
and David Shairp, *Global Strategist and Portfolio Manager, Asset Management Solutions Group*

In brief

Whatever the cyclical outlook over the next year, over the strategic time frame of the *Long-term Capital Market Return Assumptions* we see few current equity market dislocations large enough to dramatically skew returns. In fact, many key drivers have been on a normalising trend since the end of the global financial crisis of 2008-09, and we expect this normalisation process to complete well within our 10- to 15-year time frame.

- Earnings cycles have diverged in the wake of recent financial crises, suggesting scope for earnings growth to modestly outperform economic growth over our time horizon in Europe and Japan as trends normalise.

- Dividend payout ratios have risen to near long-run averages across regions and have been further enhanced by share buybacks, with companies accommodating the increased demand for income caused by demographic changes and a low interest rate world. From here, however, we expect levels to stay relatively stable.

- Despite the rise in equity valuations over the past year, the current level of valuations should not present a headwind to returns. While U.S. equities appear to be trading around fair value, European and emerging market valuations remain low, and these markets should enjoy a modest boost to returns as valuations return to normal.

- Emerging markets should continue to outperform their developed market counterparts, albeit at a reduced rate as the pace of emerging market economic growth adjusts downwards.

Framework description

To derive our equity market assumptions, we use a simple, transparent framework consisting of several building blocks, described in turn below:

(1) Growth drivers (Earnings per share – EPS vs. GDP growth)

Our framework begins with underlying economic activity—real GDP growth plus inflation—which we believe ultimately drives earnings growth in the long run.

EXHIBIT 1: SELECTED EQUITY LONG-TERM RETURN ASSUMPTIONS AND BUILDING BLOCKS

Equity assumptions	U.S.	Europe ex-UK	UK	Japan
Real GDP	2.50	1.50	2.00	1.00
Core inflation	2.25	2.00	2.50	0.75
Nominal GDP	4.75	3.50	4.50	1.75
EPS growth	4.50	4.00	4.50	2.50
Dividend yield (DY)	3.00	3.75	3.50	2.50
Valuation impact	0.00	0.25	0.25	-0.25
Total return, local currency	7.50	8.00	8.25	4.75
Real returns	5.25	6.00	5.75	4.00
DY as % of total return	40%	47%	42%	53%

Source: J.P. Morgan; estimates are as of 30 September 2013.

Given recent divergences in earnings cycles following the global financial crisis of 2008-09, we see scope for earnings growth to outperform GDP growth over the next 10-to-15 years in some regions. In particular, in Europe (and the UK) earnings are currently significantly depressed and well below the long-run trend as a result of the protracted eurozone recession.

As some degree of economic normality returns we expect corporate earnings to regain lost ground. While the exact timing is difficult to anticipate, the bulk of this earnings recovery should occur in the early years of our time horizon (and operational gearing will help here). In any case the process should easily complete inside the 15-year horizon.

Conversely, while the level of emerging market earnings looks close to the trend of recent years, with declining economic growth potential, earnings growth should also be downgraded. In the U.S. earnings are sufficiently close to trend that we assume they will perform in line with economic growth going forward.

(2) Dividend yield

To take account of the important contribution made by dividends to equity returns in our framework, in the second step we add the dividend yield.

Across regions, payout ratios have risen close to the average of the last two decades. Consequently, we assume that payout ratios and dividend yields remain roughly stable over the *Long-term Capital Market Return Assumptions* horizon across all regions. We have, however, allowed for a modest uplift to returns from buybacks which, for simplicity, we have included in the dividend yield assumptions.

EXHIBIT 2: DIVIDEND PAYOUT RATIOS

	Current payout	Average payout since 1995	Average payout since 1973
MSCI U.S.	36%	37%	44%
MSCI UK	50%	49%	52%
MSCI Europe ex UK	55%	50%	51%
MSCI EM	33%	36%	n/a
MSCI DM	43%	43%	47%

Sources: MSCI, Thomson Reuters Datastream; monthly data from January 1973 to September 2013.

For instance, in the U.S., the payout ratio has recovered from the record low of around 30% to which it had fallen as recently as 2011. The headline measure has recovered to 36% as of September 2013. While this remains below the long run average of 44%, it is almost precisely in line with the average since the mid 1990s, when a structural shift towards share buybacks began in the U.S. Since then, the U.S. payout ratio has been understated by the effects of buybacks. According to Professor Aswath Damodaran, payout ratios have averaged 2.7% of the S&P 500 Index per annum from 2001-2012, ranging from 1.2% to 4.6%[1].

(3) Starting valuations and fair value

In the third step of our framework we take into account starting valuations and assume that over the long term markets will tend to move towards "fair value." To arrive at long-run "fair" valuation levels for equity markets, we estimate a long-run equilibrium cost of equity (CoE), defined as nominal bond yield plus equity risk premium (ERP). For the bond yield, we use the standard economic assumption that yields should equal nominal GDP growth in the long run. For the ERP we have applied standard estimates taken from academic studies, although these are admittedly subject to debate.

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[1] Estimates by Professor Aswath Damodaran, http://aswathdamodaran. blogspot.co.uk/2013/03/a-sweet-spot-for-us-equities.html

We also estimate a long run return on equity (RoE) from historical data. Conventional wisdom holds that RoE tends to revert to the mean, and that this reversion is mostly driven by margins. However, in reality, different accounting standards mean that the levels of leverage and asset turnover (the other two main drivers of RoE) can differ significantly between regions, even though overall RoEs showed some tendency to converge pre crisis. It will remain to be seen whether this tendency reasserts itself in coming years, but for now we have stuck with historical averages.

EXHIBIT 3: GLOBAL ROE
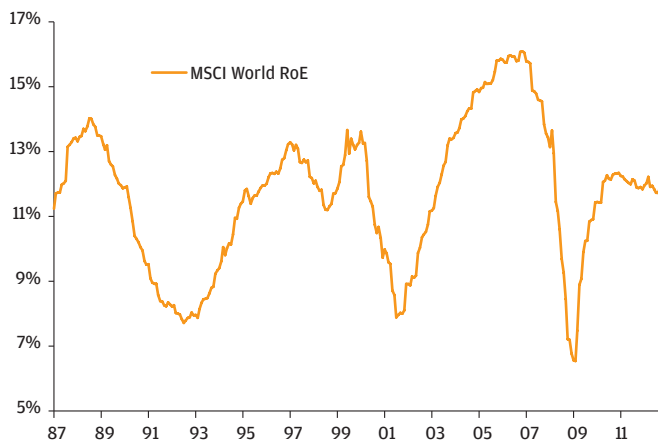
Source: MSCI, Thomson Reuters Datastream; monthly data from January 1987 to September 2013.

Emerging markets

We have reduced our expected return premium for emerging relative to developed markets to 150 basis points (bps), mostly as a result of a downgrade in long-run economic growth potential. However, with the recent underperformance of emerging market equities, we assume a 25 bps per annum return uplift from the current depressed valuation levels. This underperformance has taken emerging markets back towards parity vs. developed markets according to our composite valuation index.

EXHIBIT 5: FAIR VALUE PRICE-TO-BOOK RATIO MATRIX FOR DIFFERENT LEVELS OF COE/ROE, ASSUMING 4% PERPETUAL GROWTH (NOMINAL)

		RoE								
		8	10	11	12	13	14	15	16	17
CoE	5	4.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0
	6	2.0	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5
	7	1.3	2.0	2.3	2.7	3.0	3.3	3.7	4.0	4.3
	8	1.0	1.5	1.8	2.0	2.3	2.5	2.8	3.0	3.3
	9	0.8	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6
	10	0.7	1.0	1.2	1.3	1.5	1.7	1.8	2.0	2.2
	11	0.6	0.9	1.0	1.1	1.3	1.4	1.6	1.7	1.9
	12	0.5	0.8	0.9	1.0	1.1	1.3	1.4	1.5	1.6

Source: J.P. Morgan.

EXHIBIT 6: EMERGING VS. DEVELOPED MARKET RELATIVE VALUATION INDICES *

Source: J.P. Morgan, MSCI, Thomson Reuters Datastream; monthly data are as of September 2013.

*Note: The composite valuation indices are geometrically weighted indices of four metrics (forward price to earnings, price to book, price to cash flow and dividend yield) for the MSCI World and MSCI Emerging Market Index, rebased to their 1995–2012 averages.

A factor that is difficult to estimate is the impact of dilution on emerging market earnings growth. Over the past decade this has been significant, averaging about five percentage points in excess of developed markets. However, theory suggests that the rate of dilution should be related to the level of economic growth, due to the rate of new entrants into markets.

EXHIBIT 4: ROE ASSUMPTIONS

		MSCI U.S.	MSCI Europe	MSCI Europe ex UK	MSCI UK	MSCI Japan
RoE average	Average since 1974	14.6%	12.4%	11.2%	14.9%	6.6%
	Average ex tech bubble	14.3%	12.2%	11.0%	14.7%	7.1%

Source: MSCI, Thomson Reuters Datastream; monthly data from January 1974 to September 2013.

Combined with improving corporate governance, this leads us to assume a lower rate of dilution going forward (2% per annum).

Nevertheless, we believe that the emerging world will outperform the developed markets over the longer term. As a bloc, emerging markets have more robust demographics and their public finances are generally in much better shape than their developed world counterparts. Emerging market banking systems are healthier and more likely to support economic growth. Accordingly, a significant return differential to developed markets should persist in our view, reflecting better future prospects for emerging markets overall.

Size

We have cut the return premium for small cap over large cap to zero in the U.S., while keeping it at 25 bps in Europe ex UK and at 50 bps in the UK. For U.S. small cap equities, valuations have moved close to extremes relative to large cap and so we believe that mean reversion is likely to occur over the investment horizon of the *Long-term Capital Market Return Assumptions*.

We have maintained a small return premium for mid cap U.S. equities as this is the segment of the market that is a target for private equities. The small and mid cap valuation premium in Europe and the UK does not look as extreme as in the U.S., but we stick with a relatively modest premium in Europe ex UK as financing conditions are likely to remain a significant constraint for the next several years.

The storyline continues

by **Anthony Werley,** *Chief Portfolio Strategist, Endowments & Foundations Group*

In brief

Risk asset assumptions for credit, real assets, commodities and portions of global equity are generally lower, while global core fixed income assets are higher compared to the 2013 estimates. The result is a broad-based reduction in alternative strategy return expectations.

The importance of manager dispersion and selection continues to play a meaningful role in whether investors are able to meet their own risk and return expectations. At the median manager level, however, we make the following observations:

- Private equity returns can be expected to generate a very modest premium to public large cap equity investing.

- Hedge fund returns are marked lower, consistent with the reduction in core beta exposures and a continuation of the headwind thesis in the 2013 *Long-term Capital Market Return Assumptions*. Diversified hedge fund returns, are expected to produce an attractive risk-to-return dynamic more akin to a 50/50 stock-bond mix.

- The commodities supercycle is well past its prime return phase, as return expectations have been reduced to a more modest premium above global inflation.

- Real asset returns, especially within core real estate segments, have experienced rapid price escalation over the past few years, leaving future return expectations closer to long-run average returns. Opportunities still exist in extended risk, value-added strategies.

Manager dispersion places premium on strategy selection

Traditional asset class returns provide the essential building blocks for projecting alternative strategy returns. This year's return assumptions for alternatives are reduced commensurate with the lower return expectations for global equity, global credit and commodities. Core fixed income returns are expected to rise modestly, compressing the spread between higher risk and low-to-non risk assets.

Manager dispersion can be expected to remain wide, however, placing an increased premium on strategy selection over alternative asset allocation. The manager dispersion chart in the private equity section (**Exhibit 3**) places the dispersion vs. beta return issue in context. As has been stated in past assessments, the alternative manager toolbox of leverage, short selling, concentration, illiquid securities and non benchmark orientation is no panacea for exceeding, or even matching, public equity returns—at least in the hands of the median hedge fund and private equity manager.

In the following sections, we discuss our assumptions for the various alternative strategy classes in more detail (see **Exhibit 1A** and **Exhibit 1B**).

Absolute return/hedge funds

We employ a factor approach to determining the core beta exposure each composite hedge fund series exhibits. The factor approach uses a regression based quantitative methodology that seeks to find the best fit of a composite's return vs. a representative sample of traditional market factors, such as returns for the S&P 500, high yield and U.S. government bonds, etc.

The factor approach has delivered a consistently high level of explanatory benefit with regard to a hedge fund composite market risk or beta exposures. These market risk exposures are multiplied by the traditional long-term market return assumptions. We apply macro adjustments to the statistically derived output to reflect expectations for various factors, including changes in beta over time, forward market conditions and growth of assets. The output of this approach is a composite expected long-term equilibrium projection.

Other methodological considerations shaping our long-term assumptions include:

- Hedge fund categories, which are defined by Hedge Fund Research, Inc (HFRI) index definitions
- Historical analysis, which is based on HFRI historical manager data
- Manager returns, which are unsmoothed using the Fisher-Geltner-Webb method[1&2]

EXHIBIT 1A: ALTERNATIVE STRATEGIES—SELECTED LONG-TERM RETURN ASSUMPTIONS
U.S. dollar-based compound (IRR) 10-15 year returns

	%
U.S. PRIVATE EQUITY	8.00
HEDGE FUNDS	
Event driven	6.00
Long bias	6.25
Relative value	4.75
Macro	5.25
Diversified	5.25

Source: J.P. Morgan Asset Management; estimates are as of 30 September 2013 for private equity and 30 June 2013 for hedge funds.

Note: Private equity (PE) strategies are unlike traditional asset classes in that there is no underlying investable index. The return estimates shown above are equal to our estimates of mid-cap equity returns. Given their complex risk reward trade-offs, we counsel clients to use qualitative and quantitative approaches in setting strategic allocations to these alternative asset strategies.

EXHIBIT 1B: REAL ASSETS—SELECTED LONG-TERM RETURN ASSUMPTIONS
U.S. dollar-based compound (IRR) 10-15 year returns

	%
REAL ESTATE/INFRASTRUCTURE	
U.S. REITs	6.75
U.S. direct real estate (unlevered)	6.00
U.S. value-added real estate (unlevered)	7.75
European direct real estate (unlevered)	6.00
Global infrastructure	7.25
COMMODITIES (SPOT)	3.75
Gold (spot)	4.25

Source: J.P. Morgan; estimates are as of 30 September 2013.

[1] JD Fisher, DM Geltner and RB Webb, 1994, "*Value Indices of Commercial Real Estate: A Comparison of Index Construction Methods*," Journal of Real Estate Finance and Economics, 9:137-164.

[2] See also Abdullah Sheikh, (December 2011), "*Risk Estimation: Addressing the Impact of Serial Correlation on the Estimation of Risk*," J.P. Morgan Asset Management *Long-term Capital Market Return Assumptions*: 2012 Estimates and the Thinking Behind the Numbers

The betas residing within hedge fund portfolios continue to change on the margin year on year, even as the dominant betas remain essentially the same. For example, core betas in long-biased equity strategies remain long U.S. mid and small cap and short large cap equity. In the 2014 *Long-term Capital Market Return Assumptions* for risk assets, the key drivers of beta within hedge funds are projected to be lower in global equity, global credit and commodities, and higher in global core fixed income. These assumptions have a direct impact on all hedge fund strategy returns.

This year's forecasts continue to be impacted from a macro perspective, to a larger or smaller extent, by the industry headwinds of asset size, cross-market correlations, low interest rates and the changing patterns of market returns detailed in last year's *Long-term Capital Market Return Assumptions* paper[3]. Despite lower return expectations overall, we continue to expect hedge fund strategies to generate very attractive risk-adjusted returns—not only vs. equity markets, but also more broadly vs. stock-bond mixes, which ultimately provides the best benchmark for the performance of diversified hedge fund portfolios.

Private equity

The private equity return assumption reflects our conviction that an accurate estimation of average financial sponsor returns would suggest a modest premium to large cap public market investing over an extended period of time. Our 2014 return assumption of a 0.5% annual compound return premium vs. large cap public equity is anchored by our mid cap assumption, since the mid cap space has historically been the capitalisation focus for the largest percentage of assets dedicated to private equity.

Over the past few years, a central argument for lower private equity return expectations has been the concern that private equity is not "scalable". Can the return, and more importantly the alpha opportunity, of private equity be sustained despite the large amounts of money attracted to the strategy class?

To best answer that question, consideration should be given to whether the private equity opportunity set has expanded or morphed in a major way. On that score there is a marginally positive outlook. The coerced, or intentional, sale of private equity into the secondary market has represented a niche bright spot for returns over the past few years and likely still has some legs over the next few years. The demand for capital in the energy and energy infrastructure space is another relatively enlarged potential source of returns. A drift downward in capitalisation may represent a third alpha opening.

A blunt approach to opportunity assessment might lie in simply looking at the "dry powder"[4] (or buying power) of existing financial sponsor assets relative to the broadest interpretation of return potential from the public market capitalisation. **Exhibit 2** shows that the relationship between market cap and "dry powder" is potentially a positive one, albeit one that could change with the next capital raising cycle.

EXHIBIT 2: "DRY POWDER" VS. WILSHIRE 5000 MARKET VALUE
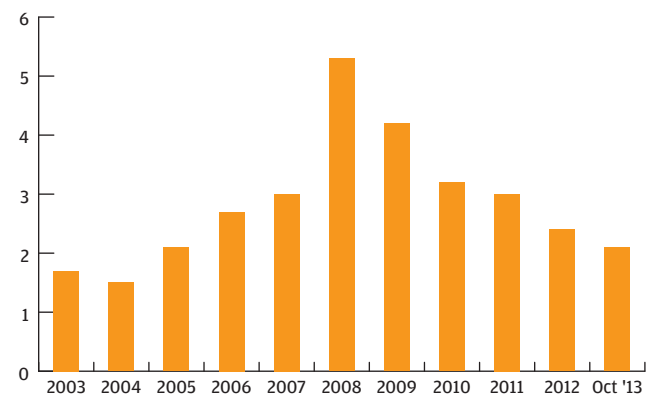
Source: J.P. Morgan, Preqin; data to October 2013.

Ultimately the value-added of private equity as a strategy class lies in the selection of skilful operators, not in the base case of average return. Private equity represents the clearest case for the necessity of achieving a return premium to the average return in the assumptions. Compensation for capital structure burdens, illiquidity, and other manager idiosyncratic risks taken necessitate a return well in excess of public market returns.

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[3] Anthony Werley, (December 2012), "I*mportance of Top Manager Alpha Increases as Composite Assumptions Moderate*," J.P. Morgan Asset Management *Long-term Capital Market Return Assumptions*: 2013 Estimates and the Thinking Behind the Numbers.

[4] Preqin defines dry powder as "the sum of uncalled capital commitments which general partners still have to invest."

Relative to traditional asset class and liquid market alternatives, return dispersion across the private equity composite has historically been the widest, reflecting these unique strategy risks and capabilities (see **Exhibit 3**).

EXHIBIT 3: MANAGER ALPHA DISPERSION
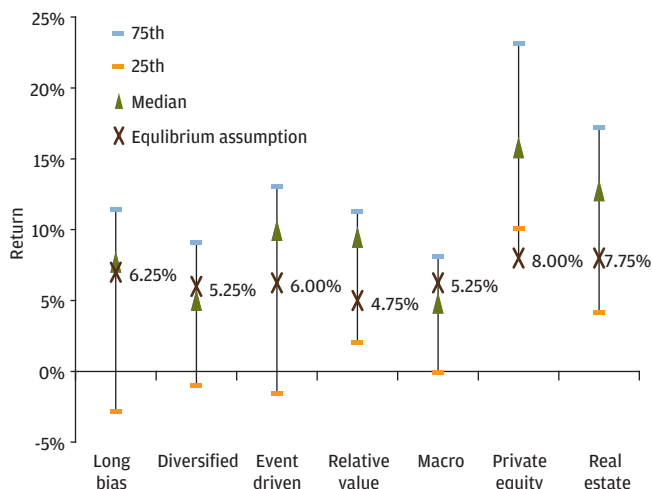
Source: Forward-looking hedge fund assumptions are J.P. Morgan estimates and based on methodologies discussed. Hedge fund manager returns are taken from Bloomberg and internal J.P. Morgan databases. Historical range is given at twenty-fifth, fiftieth and seventy-fifth percentiles using annualised returns from July 2005 to June 2013, with the exception of private equity data. Private equity historical manager returns are taken from Thomson Venture Economics data. For detailed methodology, please see below. Value-added real estate dispersion was sourced from Preqin data for the category value-added real estate funds from vintage years of 2001 to 2008. The numbers show the average internal rate of return (IRR) quartiles for the first and third quartiles, and the median IRR across these vintage years.

Given the complex risk-reward trade-off in these assets, we counsel clients to rely on judgement rather than quantitative optimisation approaches in setting strategic allocations to these asset class strategies.

Data and calculation for private equity dispersion: For the historical private equity dispersion, Thomson Venture Economics is used for the 10-year pooled horizon return data, broken down by quartiles. Private equity forward-looking return is based on the revised J.P. Morgan *Long-term Capital Market Return Assumptions* for 2014.

Underlying Thomson Venture Economics Methodology: Thomson Venture Economics private equity 10-year pooled horizon return is calculated by pooling all cash flows from a sample of funds over a 10-year time period, along with the sample's net asset value at the beginning and ending points of the calculation. Based on this pooled series of cash flows, the pooled IRR is calculated. When reporting the 10-year pooled horizon return by quartile, a fund's quartile position would be based on where the fund's cumulative IRR falls compared to funds with similar primary market, vintage year, and fund stage focus. Cash flows of funds with similar quartiles would be pooled together to find the 10-year pooled horizon return by quartile.

Commodities

We continue with our assessment that global nominal GDP growth is the best core predictor of long-term commodity spot change over a strategic time frame. Emerging economies, particularly China, have been key drivers of marginal commodity demand over the past 15 years. We assume the same should hold true going forward. We also continue with last year's assumption that an efficiency factor is at play, such that as countries grow and modernise they economise on the factors of production, including commodity inputs.

This year's commodity assumption continues with a real but considerably more muted return projection, as our global nominal growth assumption slows from 7.8% for the years 2002 to 2011, during the peak of commodity price performance, to 5.5% for the 2014 projection period. As growth has slowed, the significant increase in supply that has been building over the past 10 years, as well as other micro and non-governmental factors, have begun to play a role in dampening our return projection. The significant turnover, however, of major global mining chief executives is one example of a changed dynamic that suggests supply increments in coming years are likely to be less robust; mega-scale and less profitable capital projects are not as likely to be a source of significant new supply, at least in the outer years of our projection. Similarly, environmental, tax and regulatory issues are also likely to marginally slow the supply surge.

However, growing world—and in particular, emerging economies—suggest modest upward pressure on commodity prices over the next two economic cycles. While supply across a wide swathe of commodities has caught up with, if not temporarily exceeded, demand, microeconomic and macro considerations should eventually help create more of a demand/supply equilibrium than that which existed during the 2002-2011 time frame. On balance, the "super" or real return cycle is intact; it is just much less "super" than investors have come to expect from the glory days of quickly rising demand and supply struggling to catch up.

Gold, meanwhile, has struggled. In fact, a tougher year for asset fundamentals could not be had than that for gold in 2013. With no inflation in sight across the developed world, and with purchasing power under pressure in key high per capita gold consumption countries like India and China, gold has succumbed to intense retail selling pressure, hedge fund liquidations and shorting by the trend-following community.

Gold's hedge to U.S. dollar weakness has likewise not helped, as the trade-weighted dollar has held relatively constant, point to point, over the course of 2013. On the purchase side of the markets, world central banks reversed course starting in 2009 and have substantially increased their purchases of gold. The World Gold Council estimates that central banks will purchase about 350 tons or USD 15 billion worth of gold, at prices of USD 1,300 per ounce, in 2013.

Gold's return pattern is modelled broadly as a function of inflation expectations, the overall investment demand for commodities (gold is over 9% of the DJ UBS Commodity Index) and emerging market growth as a proxy for the high per capita consumer demand for gold. A slight offset is made to the gold return assumption, representing the great unwind of retail monies in reaction to negative performance over the past two years, following a peak in gold prices.

Real estate

Long-term real estate return estimations are typically bounded by the outlook for equity and fixed income returns, as core real estate has, over cycles, typically generated returns between those for equity and fixed income. Over time, we have also noted that core real estate returns in major developed markets are highly correlated to nominal GDP, so real growth and inflation assumptions are also key variables to consider. Finally, when moving out on the risk curve to value added and opportunistic strategies, levels of leverage and the accrual of value through operational improvements are drivers of returns that should outpace core real estate returns over longer holding periods.

Along with rising risk appetites across the capital markets, U.S. core real estate experienced above trend-line returns in 2013, and accordingly our 2014 assumption has been reduced by 0.5% on an annualised compound return basis. Some investors concerned with fixed income duration in a rising rate environment have been allocating to core real estate, contributing to outperformance in 2013. While discount rates have come down by 50 basis points (bps) in this year's assumptions, they are still wide compared to long duration fixed income on a historical basis. The current approximate return assumption of 6% for U.S. core/plus property seems reasonable fair value in light of the underlying U.S. nominal economic growth assumptions of 4.75% and the return and risk outlook of equity and fixed income.

Similar to last year's commentary, investors are relatively risk averse in the value added and opportunistic space and valuation catch-up has lagged core. The combination of a valuation lag and expected risk premia from both higher levels of leverage and the ability to create value at the property level results in the potential for relatively attractive and above trend-line returns for these strategies. To reflect appreciation over the trailing one-year period, our 2014 assumption is reduced by 25 bps to a 7.75% annualised compound return.

While discount rates for U.S. core fell, they remained stable for European core property despite the process of mild de-risking in asset pricing. Surprising firmness in the economy has raised expectations somewhat for future cash flow growth.

REITs

REIT prices have deflated from the early part of the year in reaction to rising interest rates, and the sector as a whole is now trading close to the value of its underlying real estate. We would expect that much of the investor base holding the strategy as a proxy for fixed income has been moved on, thus reducing the correlation between REITs and fixed income going forward. In the long run, REITs should return to their long-term premium to underlying values and, together with higher leverage, should produce a return premium to core real estate over time.

Infrastructure

Infrastructure returns reflect the exposure to stable sectors, such as regulated utilities and energy pipelines, as well as the need to attract capital by compensating investors for long-term commitments. Discounts have been unusually high relative to the sector's stable cash flows and diversification characteristics. 2013 saw incremental interest in infrastructure characteristics and reduced discount rates. Our *Long-term Capital Market Return Assumptions* for the infrastructure asset class have been lowered marginally as a result.

Modest changes, with a few notable exceptions

by Michael Feser, *CFA, Global Investment Director and Portfolio Manager, Asset Management Solutions Group*

In brief

For the second year running, we explicitly publish foreign exchange (FX) assumptions as part of our *Long-term Capital Market Return Assumptions*. We continue to believe that the primary benefit of our currency assumptions is to enhance the internal consistency of the data set, rather than as an exact spot point in time predictor of the level of exchange rates in 10 to 15 years.

- In light of this objective we have maintained the overall FX framework that broadly derives the assumptions from a mean reversion process of the current spot exchange rate towards the future fundamental fair value exchange rate.

- In order to increase transparency we have, however, streamlined certain aspects of the fair value estimation process and also reduced the impact of qualitative views on the final forecasts, beyond those already imbedded in our fundamental economic projections.

- As before we like to remind readers that historical market records provide ample evidence for the wide ranges in which exchange rates swing around their fair values, and we do expect future exchange rates to also swing in wide ranges around these assumptions, sometimes for sustained periods.

The analytical framework

Purchasing power parity (PPP) remains a cornerstone of exchange rate theory and of our analytical framework. According to PPP theory, exchange rates reflect the transaction value of traded goods and services between countries, which should be equal to the ratio of their price levels. PPP, therefore, does not require that each item within a basket of goods and services has the same relative price. Instead, some relatively more expensive items can be offset by other relatively less expensive items in the basket, thereby preserving the purchasing power of the country as a whole.

Focus on relative PPP

In formulating our currency assumptions, we look beyond static PPP by focusing on relative PPP. This allows us to reflect the expected change in a country's terms of trade in our currency forecasts. Relative PPP asserts that prices and exchange rates change in a way that preserves the ratio of each currency's domestic and foreign purchasing power over time. We therefore adjust the expected percentage change in the exchange rate between two countries over the assumptions horizon by the expected difference of the inflation rates between each country.

GDP per capita growth and inflation expectations

We assume, for practical purposes, that the growth rate of the GDP per capita is broadly identical across the universe of developed markets included in our set of assumptions.

While the inflation rate estimates used in the relative PPP calculations are an integral part of our existing internal process, we rely for the assessment of the absolute PPP level on analysis conducted by the World Bank/OECD Price Comparisons Programme.

Long-term currency exchange rate assumptions

With a few notable exceptions, our FX assumptions (**Exhibit 1**) mostly suggest relatively mild changes in major foreign exchange rates over the next two market cycles.

EXHIBIT 1: ASSUMPTIONS FOR SELECTED CURRENCY EXCHANGE RATES—NEXT 10-TO-15 YEARS

Currency		End Sept 2013 levels	Assumptions*	Per annum % change**
Euro	EUR/USD	1.35	1.31	-0.25
Japanese yen	USD/JPY	98	76	+2.00
Swiss franc	USD/CHF	0.90	0.96	-0.50
Sterling	GBP/USD	1.62	1.57	-0.25
Canadian dollar	USD/CAD	1.03	1.09	-0.50
Australian dollar	AUD/USD	0.94	0.73	-2.00
Swedish krona	USD/SEK	6.42	6.03	+0.50

Source: J.P. Morgan, Bloomberg. Estimates are as of 30 September 2013.

*According to market convention, CURRENCY A/CURRENCY B means one unit of CURRENCY A is worth the stated number of units of CURRENCY B. EUR/USD = 1.31 means EUR 1.00 is worth USD 1.31.

**For consistency and ease of conversion, we have assumed that the forecast horizon for the per annum change in percentage terms is exactly 12.5 years.

Euro

Similar to last year, but maybe this time less controversially so, we maintain as a base case that the euro—as a currency and monetary union—will survive in a similar form to today. Like many prior projects in the eurozone, the road to longer-term sustainability of the currency union through further integration and more centralised political control, however, is likely to be long and arduous.

Growth is gradually improving as the need for further fiscal tightening subsides. Political uncertainty is receding as well, after German voters strongly endorsed Chancellor Merkel in September's elections, handing her Christian Democratic Union and its sister party, the Christian Social Union, the biggest election victory in a German federal election since 1990. It is therefore not surprising to see the euro exchange rate just a little above fair value at EUR/USD 1.35 as of the end of September 2013.

We expect that the eurozone will need to reduce its expanded sovereign balance sheet further than the U.S., and that this will be a relative drag on growth. We therefore expect to see a small depreciation of the euro, by 0.25% annually to the equivalent of a EUR/USD 1.31 exchange rate, despite relatively lower levels of inflation than in the U.S.

Yen

The first year of Abenomics certainly had the desired effect on the yen, which is now trading substantially below fair value estimates. Combined with our fundamental outlook, we expect the yen to rise by 2.00% per annum to USD/JPY 76.

While entirely consistent with our framework, we do note that there are also compelling reasons why the mean reversion argument may not hold for the yen. On the one hand, a successful execution of Abenomics will certainly revive growth and growth prospects, but may also challenge our benign inflation outlook—and with that, the future level of fair value. On the other hand, if Abenomics fails to overcome Japan's high level of sovereign debt and grim demographic outlook, the attractiveness of Japanese assets would certainly be reduced and the yen exchange rate could trade quite persistently below fair value.

Swiss franc

Starting from a position of significant overvaluation, the Swiss franc is poised to weaken in a more stable world with less demand for safety. A relatively more benign inflation outlook will help somewhat, but the current overvaluation still suggests that the Swiss franc will have to decline at an annualised rate of 0.50% against the U.S. dollar to USD/CHF 0.96.

Sterling

The pound sterling appears fairly valued and virtually unchanged from last year at GBP/USD 1.62. Higher inflation and slower growth, however, should gradually lower the pound by 0.25% per annum to an exchange rate of GBP/USD 1.57.

Commodity currencies

Very much in contrast to last year, we have a much more sanguine outlook for the Australian and Canadian dollars, which we still consider overvalued despite the recent correction. In line with our significantly less optimistic outlook on commodities and the unfolding weakness in domestic asset markets, such as housing, we believe the adjustment has further to go. We expect the Loonie to fall by 0.50% per annum to USD/CAD 1.09, while the Aussie dollar is expected to decline by 2.0% per annum to AUD/USD 0.73–a level more typical before the commodities supercycle.

Swedish krona

The Swedish krona is currently trading very close to fair value. We still expect the krona to strengthen, aided by a more benign inflationary outlook relative to the U.S., with the currency rising by 0.50% per annum to USD/SEK 6.03.

Glossary

Corporate bonds are debt securities issued by a corporation.

Credit spread is the difference in yield between Treasury and non-Treasury securities, which are identical except for their credit rating.

Debt is some quantity owed as a result of past or present borrowing.

Deleveraging, in the macroeconomic context, refers to a reduction of a nation's total public and/or private sector debt relative to nominal GDP.

Equilibrium level is the average or cycle-neutral value for a market or macroeconomic variable (for example, the yield or credit spread) expected to prevail over the long term.

Mark to market is the accounting of the value of an asset based on its current market price.

Mean reversion is a theory that prices and yields will eventually move back to their true mean or expectations over time.

Mean variance optimiser is an optimiser that seeks to maximise expected return while holding variance constant, or to minimise variance while holding expected return constant.

NAIRU, short for **non-accelerating inflation rate of unemployment**, is the level of unemployment at which the inflation rate tends to stay the same.

Non-normality is a term we use to describe three characteristics of asset returns typically ignored by traditional mean-variance models. These characteristics include serial correlation, "fat" left tails and converging correlations. For further reading on the topic, please refer to our white paper, "*Non-Normality of Market Returns—A Framework For Asset Allocation Decision-Making*", by Abdullah Z. Sheikh, J.P. Morgan, May 2009.

Normalisation refers to the restoration of economic conditions, such as unemployment, to assumed cycle-neutral levels following a temporary dislocation period.

OECD or the **Organisation for Economic Co-operation and Development** is an international organisation of democratic countries with market-based economies founded in 1961, whose mission is to "promote policies that will improve the economic and social well-being of people around the world."

Primary budget balance of a government is its overall budget deficit (or surplus) excluding debt service net expenditures (interest and principal payments on outstanding debt).

Purchasing power parity or **PPP** exists when the same bundle of goods (usually that defined by the consumer price index) in two countries has an equal value at the prevailing exchange rate. Adjusting GDP for PPP means converting a country's GDP to another currency using the hypothetical exchange rate that would yield purchasing power parity.

REITs (Real Estate Investment Trusts) are securities that trade like equities on exchanges and invest directly in real estate. REITs act as a liquid method of investing in real estate.

Re-rating occurs when market views shift, increasing or decreasing price-to-earnings and other valuation ratios.

Risk premium is the difference between the returns investors expect to earn by holding risky assets and the expected return from holding risk-free assets.

Volatility is a term used interchangeably with standard deviation throughout this paper.

Yield curve is a line that plots the interest rates of bonds of different maturities.

Methodology

As in previous years, we have used a building-block approach to arrive at our *Long-term Capital Market Return Assumptions*. We believe that this approach provides clarity and transparency for readers and enables them to challenge and reconcile the inputs that go into our assumptions. The building blocks are as follows:

Fixed income return

Expected future yields +/- change in bond prices

Equity return

Inflation + real earnings growth + dividend yield +/- impact of valuation changes

Alternative asset returns

Historical analysis/investor judgement about relationship to public markets

Volatility and correlations

In our *Long-term Capital Market Return Assumptions*, we use a historically informed volatility estimate as our starting point. The length of the historical data set is defined as 10 years or more. The data window will be extended when the percentage of years in recession in the sample is inconsistent with the longer-term historical percentages and/or the assumptions. The sample period used in this year's process was 10 years.

For certain asset classes we adjust our estimates of annual volatility to take account of the effects of serial correlation. We also adjust the volatility estimates for selected assets based on judgement to reflect our best expectation for future volatility and to ensure that the implied risk-adjusted returns or Sharpe ratio assumptions are internally consistent.

As a final step in the process we adjust the correlation matrix to ensure its numerical integrity in order to create a positive definite matrix with two decimal points for each correlation.

Given its inherent limitations we encourage investors to not only assess risk through the lens of volatility, but to also incorporate other risk measures that capture the effects of fat-left tails, converging correlations, illiquidity and lack of transparency in their asset allocation decision making process.

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	Expected 10–15 year annualized compound returns (%)[1,2]		Rationale
U.S. ECONOMIC INDICATORS	Inflation	2.25	Significant slack in the economy overall, elevated levels of unemployment, ongoing deleveraging,
	Core Inflation	2.25	the projection horizon.
	Real GDP	2.50	The cyclical picture continues to improve and economic momentum is improving, as secular
FIXED INCOME[2]	U.S. Cash	2.00	The Federal Reserve to keep policy rates on hold for an extended period and raise them only
	U.S. Intermediate Treasury[3]	4.25	Yield levels to stay contained in the near term before rising towards their higher equilibrium levels
	U.S. Long Treasury[4]	3.25	rising rates.
	U.S. TIPS	4.75	TIPS to outperform nominal Treasuries as longer-term expected inflation rises only moderately from
	U.S. Aggregate	4.25	
	U.S. Short Duration Gov't/Credit	2.50	
	U.S. Long Duration Gov't/Credit	4.75	Spreads are expected to narrow somewhat, but total returns should remain exposed to rising overall
	U.S. Investment Grade Corporate	5.00	
	U.S. Long Corporate	5.00	
	U.s. High Yield	6.00	Any further reduction in default rates and spread narrowing will provide only limited protection to
	U.s. Leveraged Loan (BB or better)	4.50	from defaults.
	World Government Bond (Local)	2.75	Government bond yields to rise globally from current levels, leading to negative mark-to-market
	World Ex-U.S. Government Bond (Local)	2.50	normalisation due to slower economic growth.
	World Ex-U.S. Government Bond (Hedged)	3.25	Higher U.S. cash yields compared to weighted average WGBI cash yields are expected to boost
	Emerging Markets Sovereign Debt (hedged)	6.75	Spreads have room to narrow, but total returns are at risk from rising U.S. Treasury yields given
	Emerging Markets Local Currency Sovereign Debt (unhedged)	7.00	Spreads are expected to narrow further, but total returns are expected to be constrained as overall
	Emerging Markets Corporate Debt (hedged)	6.25	Yields are expected to rise as inflation and real rates in emerging economies increase to their higher
	U.S. Municipal (1-15 Blend)	3.75	Spreads are expected to narrow further, but total returns are expected to be constrained as overall
EQUITY[2]	U.S. Large Cap	7.50	Sum of below building blocks (nominal earnings per share growth + dividend yield + price-to-earnings
	U.S. Large Cap EPS Growth	4.50	Real corporate earnings growth remains robust as companies maintain cost discipline, while margins
	U.S. Large Cap Dividend Yield	3.00	Dividend yield is expected to rise as companies favor payouts over new investment.
	U.S. Large Cap P/E Return Impact	zero	Valuation multiples approach more recent historical averages, but upside is limited due to secular
	U.S. Mid Cap	7.75	Mid cap companies in particular are likely to benefit from acquisition activity by larger firms,
	U.S. Small Cap	7.50	
	U.S. Large Cap Value	7.75	Value is expected to outperform growth given starting valuations and more favorable sector
	U.S. Large Cap Growth	7.25	
	Europe ex-U.K. Large Cap (local)	8.00	An earnings premium to nominal GDP is expected due to the large share of globally sourced
	Japan Large Cap (local)	4.75	Earnings to outperform the domestic economy given exposure to fast-growing overseas markets
	U.K. Large Cap (local)	8.25	An earnings premium to nominal GDP is expected given support from foreign-sourced revenues.
	EAFE Equity (local)	7.50	Market capitalization weighted average of expectations for regional equity returns.
	EAFE Equity (unhedged)	7.75	Slight dollar depreciation against the weighted average of EAFE currencies is expected to boost
	Emerging Markets Equity (unhedged)	9.00	Overall more favorable demographics, policy flexibility and improved corporate governance should
	Asia ex-Japan Equity (unhedged)	9.25	
	Global Equity (unhedged)	7.75	Market capitalization weighted average of expectations for regional equity returns.
ALTERNATIVE/OTHER[2]	U.S. Private Equity[5,6]	8.00	Median manager returns assumed to be in line with mid cap equity. Sizeable divergence expected
	U.S. Direct Real Estate (unlevered)[5,6]	6.00	Appreciation of real estate assets, lower intial property yields and low nominal GDP expectations
	U.S. Value Added Real Estate (unlevered)[5,6]	7.75	A real estate risk assumption between core and opportunistic, seeking to enhance cash flows,
	European Real Estate (unlevered, local)[5,6]	6.00	European real estate, with low nominal GDP growth, to produce muted return expectations.
	U.S. REITs	6.75	Solid REIT performance and a slight NAV premium to direct unlevered real estate results in REIT
	Global Infrastructure[5,6]	7.25	Expectations for returns are based on continued interest in infrastructure cash flows with good
	Hedge Fund—Diversified[5,6]	5.25	Expected hedge fund returns are based on multi-variate regressions to public markets. A blend of among managers.
	Hedge Fund—Event Driven[5,6]	6.00	Blend of emerging market, commodities, mid cap, small cap, U.S. high yield and cash betas to be the
	Hedge Fund—Long Bias[5,6]	6.25	Blend of commodities, emerging market equity, and large and small cap betas to be the main driver
	Hedge Fund—Relative Value[5,6]	4.75	Blend of emerging market credit, commodities, U.S. high yield and investment grade bond betas to
	Hedge Fund—Macro[5,6]	5.25	Blend of commodities, emerging market equity and cash betas to be the main driver of median
	Commodities (spot)[5]	3.75	Return expectation is based on the growth of nominal global GDP. Returns to be less robust,
	Gold (spot)	4.25	Expected return is based on the historical relationship with inflation expectations, the U.S. dollar

*Data are as of September 30, 2013, except hedge funds (diversified, event driven, long bias, and relative value) as of June 30, 2013 and hedge fund (macro) as of May 31, 2013.

[1] Return estimates are on a compound or internal rate of return (IRR) basis. Equivalent arithmetic averages, as well as further information, are shown on page 42.

[2] All asset class assumptions are in total return terms, including equity return assumptions. All returns are in U.S. dollar terms unless otherwise indicated.

[3] U.S. Intermediate Treasury returns based on Barclays U.S. Treasury: 7-10 Year Index.

[4] U.S. Long Treasury returns based on Barclays U.S. Treasury: 20+ Year Index.

and firmly anchored market expectations will keep inflation low overall. Reflationary central bank policies create the risk for higher inflation for the outer years of

challenges from an ageing population and rising entitlement costs become more pressing.

gradually thereafter. Real rates to remain low by historical standards.

as monetary policy is eventually normalized. Dampened total returns due to both low income from the low level of yield and negative mark-to-market returns from

current levels.

yields broadly in line with Treasury rates; intermediate maturity securities benefit most from the curve roll-down.

offset the mark-to-market pressure from rising Treasury rates. Income is expected to be the driver of returns. Haircut applied to total returns for expected loss

returns during the period where rates converge to equilibrium. Outside the U.S., countries are likely to experience a prolonged period of lower rates and

returns to U.S. investors.

the long index duration.

yields rise with U.S. Treasury rates.

equilibrium levels over time. Total returns to be largely driven by income.

yields rise with U.S. Treasury rates.

return impact). Total returns are expected to recover over the long term as the corporate sector outperforms the domestic economy.

to drift gradually lower.

pressures and limited headline growth.

especially given the significant cash build-up on large cap corporate balance sheets.

concentrations.

revenues. Valuations to improve from depressed levels and dividend yields to rise moderately.

Japan to remain a global underperformer given demographic challenges and the ongoing battle with deflation.

Tolerance for higher inflation to keep valuations in check, but dividend yields are expected to rise moderately.

returns to U.S. investors.

support long-run growth even with weaker economic fundamentals.

across private investments.

reduce return expectation by 0.50% per annum from 2013 estimates.

occupancy, and building renovation; historically has given a higher yield compared to core.

returns that are broadly in line with the real asset return.

visibility and the benefit of leverage for low risk "bondable" assets.

emerging market, commodities, small cap and U.S. aggregate bond betas to be the main driver of median manager expected returns. Sizeable divergences are expected

main driver of median manager expected returns. Sizeable divergences are expected among managers.

of median manager expected returns. Sizeable divergences are expected among managers.

be the main driver of median manager expected returns. Sizeable divergences are expected among managers.

manager expected returns. Sizeable divergences are expected among managers.

reflecting large supply/demand challenges.

and emerging markets.

[5] Private equity, hedge funds, real estate, infrastructure and commodities are unlike other asset categories shown above in that there is no underlying investable index. Hedge fund returns are shown net of manager fees.

[6] The return estimates shown for these asset classes and strategies are our estimates of industry medians—the dispersion of returns among managers in these asset classes and strategies is typically far wider than for traditional asset classes.

See additional notes on the following page spread.

Correlation Matrix

	Exp. arith. return (%)[2]	Exp. comp. return (%)[2]	Exp. ann. volatility (%)[2]	U.S. Inflation	U.S. Cash	U.S. Intermediate Treasury[3]	U.S. Long Treasury[4]	U.S. TIPS	U.S. Aggregate	U.S. Short Duration Gov't/Credit	U.S. Long Duration Gov't/Credit	U.S. Investment Grade Corporate	U.S. Long Corporate	U.S. High Yield	U.S. Leveraged Loan	World Government Bond (hedged)	World Government Bond (unhedged)	World ex-U.S. Government Bond (hedged)	World ex-U.S. Government Bond (unhedged)
FIXED INCOME																			
U.S. Inflation	2.26	2.25	1.50	1.00															
U.S. Cash	2.00	2.00	0.50	0.09	1.00														
U.S. Intermediate Treasury	4.45	4.25	6.50	-0.30	0.03	1.00													
U.S. Long Treasury	4.11	3.25	13.50	-0.33	0.01	0.89	1.00												
U.S. TIPS	4.97	4.75	6.75	0.05	-0.02	0.62	0.47	1.00											
U.S. Aggregate	4.35	4.25	4.50	-0.26	0.00	0.87	0.77	0.77	1.00										
U.S. Short Duration Gov't/Credit	2.52	2.50	2.00	-0.20	0.27	0.67	0.44	0.61	0.76	1.00									
U.S. Long Duration Gov't/Credit	5.18	4.75	9.50	-0.31	-0.05	0.84	0.87	0.66	0.92	0.56	1.00								
U.S. Investment Grade Corporate	5.23	5.00	7.00	-0.24	-0.09	0.53	0.47	0.64	0.82	0.61	0.79	1.00							
U.S. Long Corporate	5.67	5.00	12.00	-0.28	-0.10	0.58	0.61	0.60	0.83	0.50	0.87	0.93	1.00						
U.S. High Yield	6.75	6.00	12.75	-0.04	-0.10	-0.06	-0.12	0.39	0.33	0.18	0.28	0.62	0.58	1.00					
U.S. Leveraged Loan (BB or better)	5.00	4.50	10.25	0.13	-0.07	-0.19	-0.22	0.27	0.13	-0.02	0.12	0.41	0.37	0.75	1.00				
World Government Bond (hedged)	3.29	3.25	3.00	-0.35	0.06	0.88	0.83	0.49	0.80	0.63	0.78	0.51	0.56	-0.07	-0.24	1.00			
World Government Bond (unhedged)	3.49	3.25	7.00	-0.12	0.05	0.59	0.46	0.62	0.67	0.64	0.56	0.54	0.52	0.27	-0.06	0.56	1.00		
World ex-U.S. Government Bond (hedged)	3.29	3.25	3.00	-0.33	0.05	0.77	0.73	0.39	0.71	0.54	0.71	0.47	0.52	-0.04	-0.22	0.95	0.51	1.00	
World ex-U.S. Government Bond (unhedged)	3.58	3.25	8.25	-0.08	0.04	0.48	0.35	0.57	0.59	0.58	0.48	0.51	0.48	0.31	-0.02	0.47	0.96	0.43	1.00
Emerging Markets Sovereign Debt (hedged)	7.41	6.75	12.00	-0.12	-0.04	0.37	0.24	0.65	0.67	0.44	0.58	0.76	0.73	0.75	0.50	0.32	0.52	0.30	0.52
Emerging Market Local Currency Sovereign Debt (unhedged)	7.69	7.00	12.25	0.03	0.05	0.12	0.01	0.47	0.40	0.31	0.31	0.54	0.49	0.67	0.32	0.11	0.56	0.12	0.60
Emerging Markets Corporate Debt (hedged)	6.86	6.25	11.50	-0.06	-0.08	0.27	0.14	0.61	0.59	0.39	0.51	0.77	0.70	0.74	0.63	0.19	0.40	0.17	0.40
U.S. Municipal (1-15 Blend)	3.83	3.75	4.00	-0.13	-0.04	0.49	0.38	0.50	0.63	0.48	0.54	0.58	0.51	0.30	0.24	0.49	0.36	0.47	0.32
U.S. Municipal High Yield	5.77	5.25	10.50	0.17	-0.07	-0.04	-0.11	0.33	0.19	0.06	0.12	0.29	0.21	0.36	0.48	-0.04	0.04	-0.01	0.06
EQUITY																			
U.S. Large Cap	8.49	7.50	14.75	0.08	-0.06	-0.26	-0.31	0.18	0.04	-0.05	-0.02	0.30	0.24	0.71	0.44	-0.27	0.19	-0.23	0.26
U.S. Mid Cap	9.17	7.75	17.75	0.11	-0.07	-0.29	-0.33	0.20	0.03	-0.07	-0.02	0.31	0.26	0.74	0.50	-0.29	0.14	-0.25	0.21
U.S. Small Cap	9.24	7.50	19.75	0.08	-0.08	-0.31	-0.34	0.10	-0.04	-0.13	-0.08	0.21	0.18	0.69	0.41	-0.31	0.10	-0.26	0.18
U.S. Large Cap Value	8.84	7.75	15.50	0.07	-0.05	-0.24	-0.28	0.16	0.05	-0.04	0.00	0.30	0.25	0.69	0.40	-0.23	0.21	-0.19	0.27
U.S. Large Cap Growth	8.27	7.25	15.00	0.09	-0.07	-0.28	-0.34	0.20	0.02	-0.07	-0.04	0.29	0.23	0.71	0.48	-0.30	0.15	-0.26	0.22
Europe ex-UK Large Cap (unhedged)	9.20	7.75	18.00	0.06	0.03	-0.23	-0.28	0.21	0.09	0.05	0.03	0.36	0.30	0.72	0.42	-0.21	0.36	-0.17	0.44
Japan Large Cap (unhedged)	7.99	6.75	16.50	0.05	-0.03	-0.11	-0.12	0.22	0.16	0.08	0.13	0.40	0.35	0.57	0.39	-0.11	0.26	-0.09	0.30
U.K. Large Cap (unhedged)	9.45	8.00	18.00	0.12	0.00	-0.29	-0.35	0.20	0.05	0.00	-0.01	0.37	0.29	0.68	0.48	-0.28	0.28	-0.24	0.36
EAFE Equity (hedged)	8.70	7.75	14.50	0.04	0.01	-0.35	-0.34	0.05	-0.02	-0.12	-0.03	0.31	0.27	0.69	0.52	-0.30	0.02	-0.23	0.09
EAFE Equity (unhedged)	9.24	7.75	18.25	0.07	0.01	-0.22	-0.27	0.24	0.12	0.05	0.06	0.41	0.35	0.73	0.46	-0.21	0.35	-0.17	0.42
Emerging Market Equity (unhedged)	11.50	9.00	24.00	0.07	0.07	-0.18	-0.24	0.31	0.15	0.08	0.08	0.39	0.34	0.70	0.45	-0.19	0.30	-0.16	0.36
Asia ex-Japan Equity (unhedged)	11.50	9.25	22.75	0.01	0.06	-0.16	-0.22	0.28	0.17	0.09	0.11	0.43	0.38	0.72	0.46	-0.15	0.28	-0.11	0.34
Global Equity (unhedged)	9.01	7.75	16.75	0.08	0.00	-0.25	-0.30	0.24	0.09	0.01	0.03	0.38	0.32	0.75	0.48	-0.25	0.28	-0.21	0.35
ALTERNATIVE/OTHER																			
U.S. Private Equity[5,6]	10.13	8.00	22.00	0.12	-0.12	-0.37	-0.39	0.10	-0.07	-0.13	-0.11	0.22	0.17	0.67	0.44	-0.35	0.08	-0.30	0.16
U.S. Direct Real Estate (unlevered)[5,6]	6.67	6.00	12.00	0.06	-0.02	0.00	-0.01	0.16	0.15	0.05	0.12	0.20	0.21	0.38	0.20	0.02	0.16	0.03	0.17
U.S. Value Added Real Estate (unlevered)[5,6]	8.84	7.75	15.50	0.06	-0.01	-0.05	-0.07	0.13	0.10	0.04	0.07	0.17	0.17	0.35	0.19	-0.03	0.15	-0.02	0.18
European Direct Real Estate (unlevered)[5,6]	6.89	5.75	15.75	0.07	-0.02	-0.06	-0.10	0.14	0.09	0.08	0.04	0.14	0.12	0.27	0.15	-0.03	0.20	0.00	0.23
U.S. REITs	8.55	6.75	20.00	0.09	-0.04	-0.06	-0.09	0.28	0.22	0.07	0.17	0.36	0.36	0.72	0.39	-0.05	0.27	-0.02	0.31
Global Infrastructure[5,6]	7.97	7.25	12.50	0.10	0.00	0.19	0.15	0.30	0.29	0.18	0.25	0.27	0.27	0.30	0.15	0.16	0.26	0.14	0.25
Hedge Fund—Diversified[5,6]	5.45	5.25	6.50	0.22	0.11	-0.33	-0.36	0.19	-0.03	-0.06	-0.06	0.26	0.19	0.50	0.46	-0.34	0.06	-0.29	0.13
Hedge Fund—Event Driven[5,6]	6.30	6.00	8.00	0.21	0.00	-0.38	-0.43	0.18	-0.04	-0.09	-0.09	0.29	0.21	0.64	0.51	-0.38	0.09	-0.32	0.17
Hedge Fund—Long Bias[5,6]	6.72	6.25	10.00	0.15	0.02	-0.36	-0.42	0.19	-0.02	-0.03	-0.09	0.31	0.23	0.67	0.49	-0.37	0.14	-0.33	0.22
Hedge Fund—Relative Value[5,6]	4.92	4.75	6.00	0.25	-0.02	-0.28	-0.34	0.32	0.11	0.03	0.05	0.43	0.35	0.70	0.66	-0.31	0.06	-0.27	0.12
Hedge Fund—Macro[5,6]	5.74	5.25	10.25	-0.02	0.19	-0.02	-0.04	0.19	0.08	0.20	0.05	0.16	0.13	0.12	-0.03	0.00	0.38	0.01	0.41
Commodities (spot)[5]	5.34	3.75	18.50	0.24	0.07	-0.13	-0.22	0.33	0.08	0.13	0.01	0.25	0.20	0.38	0.25	-0.20	0.31	-0.21	0.37
Gold (spot)	5.91	4.25	19.00	0.03	0.09	0.25	0.11	0.45	0.32	0.34	0.22	0.25	0.22	0.15	0.07	0.13	0.48	0.08	0.48

Note: All estimates on this page are in U.S. dollar terms. Given the complex risk-reward trade-offs involved, we advise clients to rely on judgment as well as quantitative optimization approaches in setting strategic allocations to all the above asset classes and strategies. Please note that all information shown is based on qualitative analysis. Exclusive reliance on the above is not advised. This information is not intended as a recommendation to invest in any particular asset class or strategy or as a promise of future performance. Note that these asset class and strategy assumptions are passive only–they do not consider the impact of active management. References to future returns are not promises or even estimates of actual returns a client portfolio may achieve. Assumptions, opinions and

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)
(1) Emerging Markets Sovereign Debt (unhedged)	1.00																														
(2) Emerging Markets Local Currency Sovereign Debt (unhedged)	0.80	1.00																													
(3) Emerging Markets Corporate Debt (unhedged)	0.90	0.69	1.00																												
(4) U.S. Municipal (1-15 Blend)	0.48	0.24	0.40	1.00																											
(5) U.S. Municipal High Yield	0.40	0.24	0.46	0.61	1.00																										
(6) U.S. Large Cap	0.55	0.67	0.55	0.04	0.27	1.00																									
(7) U.S. Mid Cap	0.56	0.66	0.57	0.06	0.29	0.96	1.00																								
(8) U.S. Small Cap	0.48	0.63	0.47	-0.02	0.20	0.92	0.94	1.00																							
(9) U.S. Large Cap Value	0.55	0.67	0.55	0.03	0.25	0.96	0.94	0.92	1.00																						
(10) U.S. Large Cap Growth	0.53	0.64	0.54	0.05	0.28	0.96	0.95	0.91	0.93	1.00																					
(11) Europe ex-U.K. Large Cap (unhedged)	0.61	0.77	0.57	0.04	0.24	0.89	0.87	0.81	0.89	0.87	1.00																				
(12) Japan Large Cap (unhedged)	0.52	0.61	0.49	0.03	0.18	0.65	0.65	0.61	0.65	0.62	0.69	1.00																			
(13) U.K. Large Cap (unhedged)	0.58	0.72	0.60	0.06	0.35	0.87	0.85	0.76	0.86	0.85	0.93	0.67	1.00																		
(14) EAFE Equity (hedged)	0.53	0.62	0.53	0.01	0.29	0.88	0.88	0.82	0.87	0.87	0.88	0.75	0.87	1.00																	
(15) EAFE Equity (unhedged)	0.64	0.79	0.62	0.06	0.28	0.89	0.88	0.81	0.88	0.87	0.96	0.77	0.94	0.90	1.00																
(16) Emerging Markets Equity (unhedged)	0.66	0.81	0.63	0.07	0.29	0.80	0.82	0.76	0.77	0.81	0.86	0.67	0.85	0.82	0.89	1.00															
(17) Asia ex-Japan Equity (unhedged)	0.64	0.78	0.62	0.09	0.28	0.78	0.79	0.73	0.75	0.79	0.84	0.63	0.82	0.81	0.87	0.95	1.00														
(18) Global Equity (unhedged)	0.63	0.77	0.62	0.05	0.29	0.94	0.93	0.88	0.93	0.93	0.95	0.73	0.93	0.91	0.96	0.90	0.88	1.00													
(19) U.S. Private Equity[5,6]	0.44	0.61	0.47	-0.02	0.30	0.90	0.93	0.95	0.89	0.89	0.80	0.64	0.77	0.82	0.81	0.76	0.74	0.87	1.00												
(20) U.S. Direct Real Estate (unlevered)[5,6]	0.31	0.33	0.24	0.11	0.13	0.35	0.39	0.39	0.38	0.32	0.31	0.27	0.28	0.29	0.32	0.27	0.26	0.33	0.35	1.00											
(21) U.S. Value Added Real Estate (unlevered)[5,6]	0.29	0.33	0.24	0.07	0.13	0.35	0.37	0.37	0.37	0.33	0.35	0.27	0.33	0.32	0.35	0.30	0.29	0.36	0.34	0.70	1.00										
(22) European Direct Real Estate (unlevered)[5,6]	0.29	0.32	0.25	0.02	0.16	0.28	0.28	0.27	0.31	0.24	0.35	0.22	0.34	0.27	0.34	0.26	0.23	0.31	0.27	0.50	0.50	1.00									
(23) U.S. REITs	0.58	0.64	0.49	0.17	0.25	0.77	0.79	0.79	0.80	0.72	0.69	0.56	0.64	0.66	0.69	0.61	0.59	0.74	0.73	0.60	0.48	0.34	1.00								
(24) Global Infrastructure[5,6]	0.34	0.32	0.29	0.18	0.13	0.29	0.30	0.29	0.31	0.27	0.26	0.23	0.23	0.21	0.27	0.24	0.23	0.28	0.25	0.28	0.21	0.15	0.45	1.00							
(25) Hedge Fund—Diversified[5,6]	0.41	0.55	0.47	0.03	0.42	0.67	0.71	0.62	0.63	0.71	0.71	0.62	0.77	0.76	0.76	0.80	0.75	0.77	0.69	0.14	0.20	0.23	0.39	0.12	1.00						
(26) Hedge Fund—Event Driven[5,6]	0.48	0.62	0.56	0.02	0.46	0.82	0.85	0.79	0.79	0.83	0.81	0.64	0.85	0.83	0.85	0.83	0.79	0.87	0.85	0.26	0.30	0.31	0.59	0.20	0.91	1.00					
(27) Hedge Fund—Long Bias[5,6]	0.53	0.69	0.57	0.00	0.35	0.86	0.88	0.83	0.84	0.88	0.87	0.70	0.89	0.88	0.90	0.91	0.87	0.93	0.86	0.25	0.29	0.26	0.60	0.20	0.89	0.93	1.00				
(28) Hedge Fund—Relative Value[5,6]	0.58	0.60	0.66	0.17	0.54	0.70	0.75	0.64	0.67	0.73	0.71	0.60	0.78	0.76	0.78	0.78	0.75	0.78	0.71	0.24	0.27	0.28	0.53	0.20	0.86	0.90	0.85	1.00			
(29) Hedge Fund—Macro[5,6]	0.18	0.39	0.12	0.02	0.09	0.25	0.25	0.21	0.24	0.26	0.37	0.38	0.39	0.28	0.42	0.50	0.45	0.38	0.25	0.02	0.07	0.07	0.11	0.04	0.59	0.41	0.49	0.30	1.00		
(30) Commodities (spot)[5]	0.41	0.54	0.45	-0.08	0.15	0.49	0.52	0.42	0.47	0.50	0.56	0.39	0.65	0.45	0.60	0.64	0.57	0.60	0.43	0.13	0.18	0.20	0.33	0.15	0.63	0.59	0.66	0.59	0.55	1.00	
(31) Gold (spot)	0.39	0.44	0.38	0.15	0.12	0.11	0.13	0.10	0.11	0.12	0.18	0.16	0.21	0.01	0.22	0.34	0.28	0.21	0.09	0.07	0.07	0.09	0.13	0.13	0.26	0.19	0.27	0.23	0.49	0.52	1.00

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