Alternative Thinking

2015 Capital Market Assumptions for Major Asset Classes

This issue presents our multi-year expected return assumptions for major stock and bond markets. Besides updating the estimates from last year, we review our framework and methodology. It still is a world of low expected returns versus historical comparison. Looking beyond major asset classes, we briefly discuss methods for assessing expected returns of smart beta and style premia portfolios.

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Executive Summary

- We review our framework for constructing estimates of long-term expected returns for major asset classes. We focus on the forward-looking real returns on stock markets and government bonds, but also discuss expectations for long-only smart beta and long/short style premia portfolios.
- Besides updating our estimates, we review our methodology, highlighting the limited predictability of future yield curve changes and analyzing mean-reversion tendencies in U.S. asset class valuations. Despite some evidence of multi-year mean reversion, our base case assumes no change in real bond or equity yields.
- Our current estimate for U.S. stocks' long-run real return is near 4%, lower than in European and emerging markets. Our current estimate for U.S. 10-year government bonds' long-run real return is near 0.5%, higher than in other major bond markets. From a historical perspective, these expected returns are among the lowest seen in the past century, especially when taken together.

Introduction and Framework

A year ago, *Alternative Thinking* presented our inaugural capital market assumptions for major asset classes, specifically the long-term expected returns[1] of major equity markets and government bonds. We will update these expected return estimates annually, both because market conditions evolve and because our methodologies may evolve based on ongoing research.

We hasten to remind readers that any point estimates for expected returns come with significant uncertainty and that the frameworks for making such estimates may be more useful than the numbers themselves. To limit repetition, we defer to last year's report for some details but describe here the broad methodology and present some new analyses beyond data updates.

We opt to present expectations in terms of *real* (inflation-adjusted) annual compound rates of return for a horizon of 5- to 10-years.[2] Over such intermediate horizons, initial market yields and valuations tend to be the most important inputs. For even longer (multi-decade) forecast horizons, the impact of starting yields is diluted, so theory and historical average returns matter more in judging expected returns. For short horizons, returns are largely unpredictable but any predictability mainly reflects market momentum and the macro environment.

Equity Markets

We estimate the prospective, or expected, real return on equity markets by averaging two common approaches:

1. **Earnings yield (E/P):** The inverse of a P/E ratio measures the ex-ante real return on equities, albeit under quite strict assumptions. We like multi-year averages of trailing as-reported earnings to smooth the excessive cyclicality in annual earnings. Thus, we use the Shiller E/P ratio which compares 10-year average (real) earnings with today's (real) equity prices.
2. **DDM yield:** According to the dividend discount model (DDM), the expected real return on equities is approximately the sum of dividend yield (DY), expected trend growth in real dividends or earnings per share (G), and expected change in valuations (ΔV), that is: DY+G+ΔV. We use the first two terms — country-specific dividend yield and country-specific real growth rate — but assume no mean reversion in valuations.

[1] Volatilities and correlations are relatively easier to forecast — both over short and long horizons — than returns because they are more persistent. We may discuss risk assumptions in other reports.

[2] As stressed in *Alternative Thinking* 2014Q1, we must be clear on precisely what expected returns are presented: total or excess of cash, nominal or excess of inflation (i.e., real); arithmetic or geometric averages; gross or net of trading costs; in which currency terms and over what horizon.

Exhibit 1 | *Building Expected Real Returns for Equity Markets*

	E/P	DY	G	DDM=DY+G	avg(E/P,DDM)
	Adj. Shiller Earnings Yield	Dividend Yield	Earnings Growth Est.	DDM Yield	Real Equity Yield
U.S.	4.0%	1.7%	1.8%	3.5%	**3.8%**
Euro-5	6.8%	2.8%	1.5%	4.3%	**5.5%**
Japan	4.2%	1.5%	1.4%	2.9%	**3.5%**
U.K.	7.2%	3.6%	1.6%	5.2%	**6.2%**
Australia	6.3%	4.4%	1.5%	5.9%	**6.1%**
Canada	5.1%	2.6%	1.4%	4.0%	**4.6%**
Emerging Mkts	7.8%	3.0%	2.5%	5.5%	**6.6%**

Source: Bloomberg, Consensus Economics and AQR. Estimates as of December 31, 2014. "Euro-5" is a GDP-weighted average of Germany, France, Italy, the Netherlands and Spain. "Emerging Mkts" is based on the MSCI Emerging Markets index. Our adjusted Shiller E/P scales up the normal Shiller E/P by 1.075 to correct for the fact that the 10-year average of a series that grows over time will systematically underestimate its current value (the scalar reflects assumed real trend growth of 1.5% and 5-year average staleness). Return assumptions are subject to change.

Both approaches (and thus the average, our bottom line) currently point to an expected real return near 4% in the U.S. and Japan, and closer to 6% in emerging markets, Europe and Australia, as shown in **Exhibit 1**.[3] These estimates are little changed from last year and remain low from a historical perspective. Still, as we'll soon see, the equity premium over bonds is significant.

Key debates: The DDM framework is useful for investors who want to use their own inputs in capital market assumptions. Each of the building blocks of real equity returns can be debated:

- Yield, DY, is naturally proxied by the dividend yield. Some observers argue for including share buybacks but net buybacks, which include both gross buybacks and gross issuance, have averaged near zero in recent decades.
- Growth, G, (more specifically, the trend real growth in dividends per share (DPS) or earnings per share (EPS)) could be assumed to be constant, say, 1.5% per annum, loosely based on the post-WWII evidence in the U.S.[4] We allow *some* country-specific variation in G guided by real GDP-per-capita growth data.[5] Our latest bottom-line G estimate is near 1.8% for the U.S., 1.5% for the developed markets average, and 2.5% for the emerging markets average.
- Change in Valuations, ΔV, is hardest to predict accurately. We would rather assume zero ΔV unless current valuations are unprecedented, such as during the latter stages of the tech bubble. In a later section we present evidence on mean-reverting valuations but our base case in Exhibit 1 assumes none. Assuming mean reversion would make us predict capital losses and lower realized returns in the coming years.[6]

[3] The first method gives higher estimated returns for each market than the second, but the cross-country rankings are broadly similar in both methods, which gives us some confidence. We intend to delve deeper into this rather large difference yielded by two very ex ante reasonable methodologies and, if we find anything substantive, we will report back (and perhaps, if warranted, tweak our methods again).

[4] Longer histories point to lower estimates, more recent histories to higher estimates. Dividend growth rates and international evidence point to slightly lower estimates. See Ilmanen's *Expected Returns* (2011, chapters 8 and 16, and references therein).

[5] We start with a survey forecast of next-decade average real GDP growth (published by Consensus Economics), subtract a slow-moving measure of the population growth rate in each country, and then "shrink," or adjust, each country's estimate halfway toward a cross-country average (near 2%).

[6] As we assume no mean reversion in valuation ratios we are less bearish than observers who expect them to revert to their lower long-run mean levels. We thus predict about 4% real annual return for U.S. equities instead of near zero (the prediction if one assumes both low starting yields and capital losses from normalizing valuations). On the other hand, we are less bullish than observers who use valuation ratios based on analyst forecasts of pro-forma earnings; these are available only since the 1980s and are upward-biased for many reasons. Another debating point is that according to some bullish commentators, changing accounting regulations have made reported earnings more conservative in the past decade, whereas some bearish commentators claim that firm managements have become more incentivized to boost and smooth earnings (and pro-forma earnings give them more room to do this). It is hard to empirically judge the net impact of such changes, so we like our position between either extreme view.

Exhibit 2 | *Building Expected Real Returns for Government Bonds*

	Y	RR	I	Y+RR-I
	10Y Nominal Govt. Yield	Rolldown Return	10Y Forecast Inflation	Exp. Real 10Y Bond Return
U.S.	2.2%	0.6%	2.2%	**0.6%**
Japan	0.4%	0.6%	1.6%	**-0.6%**
Germany	0.6%	1.3%	1.8%	**0.2%**
U.K.	1.9%	0.7%	2.2%	**0.3%**
Australia	2.9%	0.6%	2.6%	**0.9%**
Canada	1.9%	0.9%	2.0%	**0.8%**

Source: Bloomberg, Consensus Economics and AQR. Estimates as of December 31, 2014. Return assumptions are subject to change.

Government Bonds

Government bonds' prospective nominal returns, especially over long horizons, are strongly anchored by their yields. To assess prospective *real* returns, we can subtract a (say, survey-based) measure of expected inflation from nominal bond yields.

However, for bond portfolios with stable duration, so-called *rolling yield* is a better measure of expected long-run return than yield, if an unchanged yield curve is a good base case. If the yield curve is upward-sloping, this implies rolldown gains when bond yields age and roll down the unchanged curve (say, from 2.21% 10-year yield to 2.13% 9-year yield). Expected returns then exceed the yield. For example, a strategy of holding constant-maturity 10-year Treasuries has an expected annual (nominal) return of 2.8% given the starting yield of 2.2%, augmented by the capital gains from a 8bp annual rolldown yield drop.[7]

Exhibit 2 shows current rolling yields for six countries, converted to real return estimates by subtracting a forecast of long-term inflation. Real return estimates are highest for U.S., Australian and Canadian bonds (but still less than 1%) and lowest — near-zero or worse — in Japan and Europe. Note that among major developed economies, expected U.S. equity returns are relatively low while expected U.S. Treasury returns are relatively high.

Any adjustment to these expected returns boils down to expectations on future yield curve shifts. Capital gains/losses due to yield falls/rises dominate bond returns over short horizons but matter less over long horizons.

Currency and Cash Considerations

We present real returns in local-currency terms, which are not directly comparable across countries for an investor in one country. To convert these to expected real returns seen by a foreign investor (E_{int}), we must first correct for any difference in expected inflation (I) in the two countries, and then correct for the expected cash rate differential (R, if hedged) or the expected exchange rate return from spot rate changes ($E_{currency}$, if unhedged). The adjustment for currency-hedged positions reflects the expected real cash rate differential.

$$E_{int\ hedged} = E_{local} + (I_{local} - I_{home}) + (R_{home} - R_{local})$$

$$E_{int\ unhedged} = E_{local} + (I_{local} - I_{home}) + E_{currency}$$

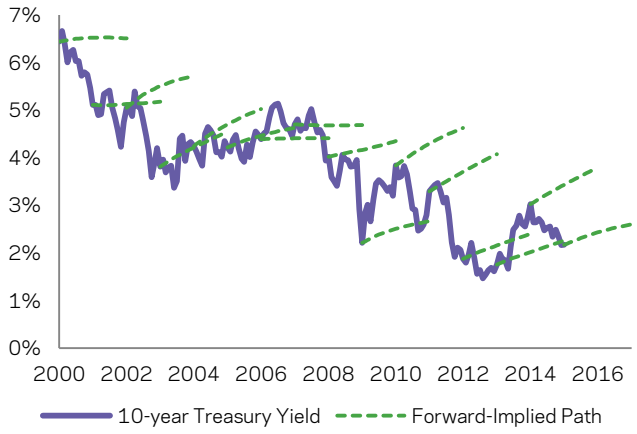
These corrections are currently small for most developed markets. Likewise, to present results in terms of excess returns over cash, we would need to subtract the expected real return of cash from the expected real market returns in Exhibit 1. (Again, this correction appears small for many developed markets, although multi-year forecasts of real cash returns are not readily available outside the U.S.)

Analyzing the key drivers of valuation changes in major asset classes is one topic we expect to tackle in future research.

[7] The estimate starts with the yield of a constant-maturity bond portfolio (Y), adds on the one-year rolldown gains in an unchanged yield curve scenario (RR), and then subtracts expected long-term inflation (I) to get expected real return. One could add to this the annual capital loss of any expected yield rise (roughly, duration times yield rise, pro-rated to the number of years).

Over the past few years, many investors have held strong views that (1) bond yields will rise soon, and (2) this outcome will be very bad news for bond investors. So far the first view has not worked, and we will argue that it is not so clear that either view will be correct for the future. Both at the beginning of 2014 and now, a year later, economist surveys (such as Bloomberg or Blue Chip Financial Forecasts) display a near-unanimous consensus predicting rising Treasury yields. Also, market forwards have long predicted rising bond yields, in vain. **Exhibit 3** shows such forward-implied yield increases (reflecting an upward-sloping curve) at almost every year-end since 2000. However, we will stress below that an upward-sloping yield curve can reflect market expectations of rising rates, a required term premium, or a combination of the two.

Exhibit 3 | *History of U.S. 10-year Treasury Yields and Forward-Implied Paths at Each Year-End, 2000-2014*



Source: Bloomberg and AQR.

Last year, we acknowledged (if only partially) the consensus mindset and assumed that some fraction of the rising yields implied by market forwards would materialize. After reviewing many strands of research, we choose not to repeat this assumption here. Rising yields is definitely a plausible risk scenario but this is not our base case. We list below four empirical reasons for assuming an unchanged yield curve as a better base case scenario.[8] There are many ways to forecast yield changes — market forecasts, survey forecasts, statistical models and discretionary macro forecasts — and we review each in turn.

1. Historically, market forwards have been poor predictors of future yield shifts. Exhibit 3 is only a visual illustration but the evidence goes much further back. Yields do not tend to move toward the forward-implied values, which contradicts the "Expectations Hypothesis." Put simply, steep yield curves do not tend to be followed by rising yields but more often by *falling* yields (thus augmenting long bonds' initial yield advantage with capital gains). Frederick Macaulay referred to this empirical pattern back in 1938. Fama and Bliss published an authoritative empirical study on this topic in 1987, concluding that yield curve shape predicts future excess bond returns (the term premium) rather than future yield changes.[9]
2. As noted, surveys today predict rising yields, suggesting that today's steep curve could reflect only rate expectations rather than a positive term premium. However, consensus can be wrong and is at times even an inverse predictor of future investment returns. Recent studies indicate that bullish survey forecasts predict low future returns both in equity market timing and in cross-sectional trading strategies.[10] Such evidence raises questions about the usefulness of surveys for predicting future rate changes.
3. Bond yields (both nominal and real) are historically low, and fast reversion to "normal" levels would be unambiguously bearish. However, nominal yields have exhibited scant

[8] If we had retained last year's assumption of half the forward-implied yield rise, the return estimates in Exhibit 2 would be 0.4% lower for the U.S. and a roughly similar amount lower for the other markets.

[9] Even the sign is wrong compared to the Expectations Hypothesis. One simple statistic is that the correlation between yield curve steepness and the next-year change in 10-year Treasury yield has been -0.2 during the past 90 years (the rolling 30-year correlation hovered between -0.1 and -0.3 since the mid-1950s). Also see in chapter 22 of Ilmanen (2011) *Expected Returns* a review of the evidence against pure Expectations Hypothesis (which assumes that forwards reflect only the market's rate expectations and no time-varying term premia).

[10] See Greenwood and Shleifer (2013) "Expectations of Returns and Expected Returns," *Review of Financial Studies* 27(3), 714-746; and Koijen, Schmeling, and Vrugt (2014) "Survey Expectations of Returns and Asset Pricing Puzzles," SSRN working paper.

mean reversion tendencies in the post-WWII data because past inflationary episodes were so persistent. Real yields have exhibited more of a mean reversion tendency — we will return to this evidence below and show that the message is similar for both stocks and bonds. We do not assume mean reversion as a base case but will argue that both asset classes are (perhaps equally) vulnerable to any reversal from today's low real yield levels.

4. Macro arguments are reasonably balanced. The U.S. economy seems quite robust, but Europe, Japan and many emerging economies seem more fragile. Major central banks appeared unable to generate inflation at their target level even before the recent sharp decline in oil prices. Of course, the easy monetary and fiscal policies since 2008 may one day lead to higher inflation, and real yields can normalize, but this could well happen beyond our 5- to 10-year horizon. Nearer term, the risks of lower structural growth and further financial crises could push inflation and yields in the other direction.

Whatever bond yield forecasts are for the coming years, too many investors simply assume that rising yields will make bondholders lose money. This may be true when yields move suddenly but not necessarily when they rise gradually. Upward-sloping yield curves and improving reinvestment rates would cushion bondholders against capital losses. Indeed, while investors focus on the asymmetric likelihood of any yield moves (there is undeniably more room for rising than falling yields today), many miss the fact that the return consequences of a given yield change are asymmetric the other way (due to the rolldown gains as well as the convex price-yield relation).

New research by Marty Leibowitz and his coauthors is worth highlighting. They show that over a multi-year horizon a stable-duration portfolio is surprisingly well anchored to its starting (rolling) yield, irrespective of future yield trends. Capital losses from rising yields are gradually offset by higher reinvestment rates (not just on coupons but on maturing bonds, to maintain the stable/target duration), making the annual return converge toward the starting yield at a horizon of between one and two times the portfolio duration.[11] Over short horizons, capital losses (gains) from rising (falling) yields of course dominate realized returns.

Finally, any protracted falling yield scenarios would likely coincide with "bad times" for broader institutional portfolios (asset values fall, liability values rise, sponsor needs cash), which would make any safe-haven investments especially valuable. There are of course converse scenarios where bonds suffer and equities do well (say, inflation and/or real rates rise but the growth news is benign enough that stocks rally); these are relatively good times for most investors. And then there are the ugliest scenarios where stocks and bonds sell off together.

Do not mistake us for bond bulls — this is an especially hard case to make for Japanese and German government bonds whose nominal 10-year yields near 0.5% only barely exceed cash. Even a base case of unchanged yield curves implies very low real future returns in Exhibit 2, and we recognize that the asymmetric yield outlook is an increasingly relevant risk scenario.

Historical Perspective and Mean Reversion

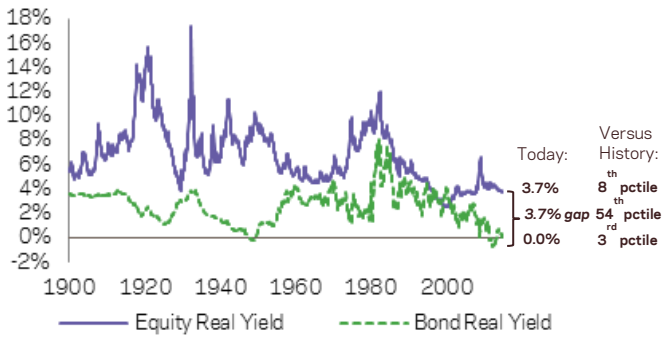
Both U.S. stocks and bonds offer today historically low real returns. **Exhibit 4** shows that both asset classes are within the 10th percentile of their richest levels since 1900.[12] In the bottom-right of the graph we show first the end-2014 levels of each real yield

[11] Full convergence occurs at horizon 2*Duration-1, but the annual return converges toward the starting (rolling) yield level a couple of years earlier. For example, if a bond portfolio has a stable 5-year duration, its annual return will converge to its starting yield in nine years even if yields trend sharply higher or lower during the horizon. See Leibowitz, Bova, and Kogelman "Long-Term Bond Returns under Duration Targeting," *Financial Analysts Journal*, January/February 2014, 31-51; and "Forward Curve Shifts and Return Convergence," *Journal of Portfolio Management*, Fall 2014, 170-182.

[12] Compared to Exhibits 1-2, there are two differences in Exhibit 4, both due to historical data limitations. For equity real yields, we assume a constant 1.5% real earnings-per-share growth rate (G), while for bonds we do not include any rolldown return (RR).

(and their spread) and then the percentile of each value over the 1900-2014 history.

Exhibit 4 | *History of Forward-Looking Real Returns of U.S. Equities and 10-year Treasuries, 1900-2014*



Source: AQR and Robert Shiller's website. Data description: The real equity yield is an average of the Shiller earnings yield (using 10- year earnings) scaled by 1.075 (embedding an annual EPS growth of 1.5%) and dividend yield plus 1.5% (roughly the long-run real growth of dividends-per-share and earnings-per-share). The universe of stocks represented is the S&P 500. The real bond yield is the yield on long-term U.S. Treasury bonds minus long-term expected inflation based on Blue Chip Economic Indicators, Consensus Economics and the Federal Reserve Bank of Philadelphia. Before survey data became available in 1978, expected long-term inflation is based on statistical estimates and on 1-year ahead Livingston inflation forecasts. No rolldown returns are added to the bond yields.

It may surprise some readers that both asset classes are almost equally expensive compared to their long histories. Specifically, the 3.7% difference between the expected real return of equities and bonds, which we call the real yield spread, is close to the median spread since 1900 and actually below the mean spread of 4% since 1900. (If we only use data from the past 50 years, equities look cheaper versus bonds, with the spread at the 75th percentile instead of the 54th percentile.)

If we combine these two expensive asset classes into a hypothetical 60/40 stock/bond portfolio (not shown), the valuation is historically even more extreme (the forward-looking real return of 2.2% is the lowest since 1900, and less than half of its century-long average of 5%).[13]

We do not have nearly as long histories for other countries as for the U.S., but data since the 1980s (not shown) tells us that both asset classes offer historically low real yields in all major economies. So the low expected return story is not specific to the U.S. or even to these two asset classes; all long-only assets we study appear to be rich compared to their own histories.

One aspect of the story differs when we look at the relative richness of equities and bonds outside the U.S. Recall from Exhibits 1-2 that U.S. equities have low real yields in an international comparison, while U.S. Treasuries have high real yields compared with other countries. Thus, the real yield spread between equities and bonds is more than 4% for Japan and Germany and nearly 6% for the U.K., compared with just 3.2% in the U.S.

Given today's low real yields (high valuations), many investors worry about the prospect of these real yields reverting to historically more typical levels. **Exhibit 5** shows scatterplots of 5-year changes in these real yields on their starting levels of real yields (compared to their past historical norms).

The patterns are remarkably similar for both asset classes. There is a negative relationship, with a slope near -0.5. In words, any deviation from the past average real yield level has tended to revert halfway toward the normal level over a 5-year horizon. Orange squares show current values based on the regression equation.[14] Equities and bonds are currently 1.8% and 2.9% below their 60-year average real yields, respectively. Multiplying these values with the mean-reversion slope coefficients in Exhibit 5 implies a predicted 0.9% and 1.3% rise in equity and bond real yields, respectively, over the next five years (that is, 18bp and 26bp yield increase each year).[15] The impact on returns would be worse

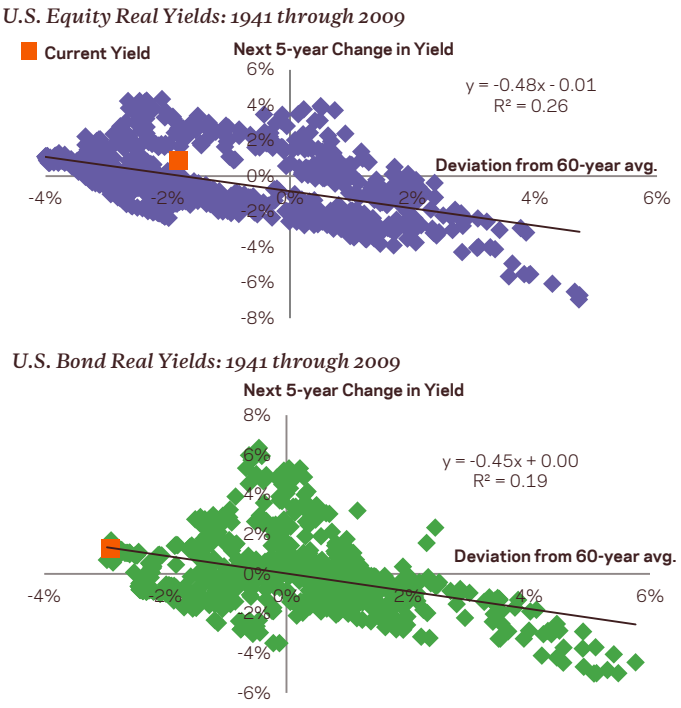
[13] We do not delve in this report into the fundamental reasons for the low forward-looking real returns. Possible culprits include a combination of low real growth and inflation expectations, a global savings glut, as well as easy monetary policies, which may lower diverse required risk premia.

[14] We only use the regression slope coefficient for the fitted value, not the intercept. This matters for equities where the orange square is above the regression line. The intercept of -0.01 reflects the fact that equity earnings yields and dividend yields trended lower since the 1940s. We do not think it makes sense to extrapolate that this trend richening continues in the future, so we omit the intercept. T-statistics for the regression slopes are -3.6 for equities and -2.6 for bonds, indicating that the results are statistically significant (these are Newey-West t-stats, adjusted for overlapping observations).

[15] Exhibit 5 displays 'out-of-sample' analysis where the starting level of real yields is compared at every point in time to its 60-year rolling

for equities given their longer duration[16] and lack of a rolldown cushion (although not worse in risk-adjusted terms).

Exhibit 5 | *Evidence on Multi-Year Mean Reversion in Real Yields of U.S. Equities and Bonds*



Source: AQR. See Exhibit 4 for data description.

Thus, even the mean reversion story is surprisingly similar for U.S. stocks and bonds. Some investors are eager to assume mean reversion for bonds but not for stocks. However, empirical analysis shows that this assumption is not supported by historical experience. Not only are both asset classes roughly equally expensive compared to their historical values, but also their expected losses from typical mean reversion are broadly comparable, and even the historical explanatory power (R^2s in Exhibit 5) of mean reversion is relatively similar.

Recall that our base case assumptions in Exhibits 1-2 do not include mean reversion in either equity market valuations or real bond yields. Some statistical evidence in Exhibit 5 would support including mean reversion and thus lower expected returns. At least this is a meaningful risk scenario, if not the base case. But, we repeat, the risk scenario applies to both asset classes in the U.S.

Why do we assume no mean reversion? The relationships are noisy (R^2s are 19-26%), and this time could actually be different, for once. There may have been a structural change that keeps real yields low and inflation moderate for at least another 5- to 10-years (our horizon) — perhaps a slowdown in equilibrium growth rate or a secular private sector deleveraging following decades of rising leverage. Or larger saving pools and investors' better access to global capital markets at lower costs may have sustainably reduced the real returns investors require on asset class premia, and we'll never see a reversal. (A lower equity premium versus cash going forward would also help reconcile an academic puzzle of an "inexplicably" high excess equity return in historical data, the so-called equity premium puzzle.) These are plausible arguments for assuming no reversal back to the past-century average levels, despite the statistical patterns in Exhibit 5. We simply do not know. Overall, we estimate low future returns merely from the low starting yields and recognize that there is a risk case of even lower returns in the coming years if the mean-reversion scenario materializes.

Cash and the Lure of Market Timing

The prospects for cash returns depend on the expected path of inflation and of real cash rates. Long-term inflation expectations have been

average (which was available information to investors at the time). We have also studied the 'in-sample' results where the starting yield is compared to the full history of its levels (past and future using more than a century of data), thus allowing look-ahead bias. The main results are similar, though more bearish for equities, as mean-reversion regressions imply a 1.6% rise in real equity yields over the next five years (and still a 1.3% rise for bonds).

[16] Equity duration is a complicated concept, and any estimates should be taken with a grain of salt, but it is clear that equities are long-lived assets. If we treat equities as perpetual annuities, their expected cash flows imply a duration near 50 given a dividend yield of 2%. A more realistic model suggested a typical duration near 15; see Dechov, Sloan, and Soliman (2004), "Implied Equity Duration: A New Measure of Equity Risk," *Review of Accounting Studies* 9, 197-228. Assuming equity duration of 15, the expected 18bp annual yield rise would cause 2.7% annual capital loss, unless the yield rise coincides with improving cash flow expectations. In contrast, with a bond portfolio duration of 8, the expected 26bp annual yield rise would cause 2.1% capital loss (partly offset by rolldown).

extremely well anchored. Economist forecasts in the U.S. have stayed in the narrow range between 2.1% and 2.7% for the past 16 years (now 2.2%), and market-based break-even inflation rates remain stable. A more imminent question is the pace at which real cash rates normalize from their exceptional negative levels (still below -1% in the U.S.). The Fed will be the first G-3 central bank to hike policy rates but even it intends to act "patiently," while the ECB and the Bank of Japan will likely continue quantitative easing. We can repeat from last year our view that world economies and financial institutions do not appear ready for the medicine of steeply rising real yields, suggesting that a low expected return environment may remain with us for several years.[17] The consensus view in economist surveys predicts that real U.S. cash rates will normalize to above 1% (nominals to above 3%) by 2018,[18] whereas the "new neutral" argument points to a slower normalization and real policy rates near zero for longer. We do not make direct forecasts of policy rates but sympathize with the latter view.

Cash is an important investment option in a world where all investments appear historically expensive. Some contrarian market-timers recommend moving the whole portfolio, or a large chunk of it, into cash. To make that call, you have to get your timing right and that is not easy. Recall that both equities and bonds offer today lower long-run real returns than they have done in the past, but if valuations do not change, they should still outperform cash (which offers a negative real return). There is a very plausible macro case that the current environment persists for several years. Before investors shift to cash they must ask if they really have the patience to wait, and the ability to withstand being temporarily and possibly substantially wrong.

In summary, while we definitely are in a low expected return environment, we do not know if low returns will materialize through a "slow pain" world where real yields stay persistently low and we earn low returns due to low starting yields (low income) or through a "fast pain" world where real yields correct sharpy higher, resulting in large capital losses for long-only capital assets (though better prospective returns thereafter). In the first scenario, cash should be the worst-performing asset; in the second scenario, it should be the best of a bad lot. Investors face a tough choice but we are especially humble when it comes to aggressive market timing.[19] We believe an aggressively risk-diversified portfolio will serve investors best.

Other Investments[20]

"Smart Beta" (Style-Tilted Long-Only) Portfolios

The expected returns shown in Exhibit 1 are based on the yields of large-cap, cap-weighted market indices. What about so-called smart beta portfolios? Smart beta portfolios can often be viewed as a bundle of a cap-weighted portfolio and an overlay of a constrained style tilt, say, overweighting cheap stocks and underweighting expensive stocks. Many of these portfolios are designed with the intention of increasing expected returns (some focus on reducing risk); can we quantify this increase?

Smart beta strategies exhibit so many design variations that it is difficult to generalize.[21] For

[17] We may of course be wrong. In that spirit we explored last year the historical performance of major asset classes and diversified portfolios during the ten worst episodes of sharply rising real bond yields since the 1970s. See *Alternative Thinking* 2014Q2: "Should Investors Worry About Rising Real Yields?"

[18] Other countries do not have as long multi-year survey forecasts of future cash rates as the U.S. However, if we compare market forward paths and consensus inflation forecasts, it seems likely that other major economies face a longer period of negative real cash returns than the U.S.

[19] Our previous *Alternative Thinking* (2014Q4) discussed the challenges of contrarian market timing. It noted that contrarian signals are often too early. For a vivid example, the Shiller P/E ratio of the U.S. equity market reached its 80th percentile expensiveness in 1992. Who could have outlasted the long 1990s bull market staying in cash? This is a relevant precedent — rich assets remaining rich or getting richer — for anyone contemplating large cash holdings today, especially given the negative real return on cash. Moreover, market timers face a second challenge of when to re-enter the risky asset markets after these have cheapened. Historically this has been no easier than the timely exit before the downturn.

[20] For a discussion on how to think about the expected returns of credits, commodity futures and illiquid alternatives — though no explicit forecasts — see *Alternative Thinking* 2014Q1.

information ratio assumptions, historical performance is the natural starting point but some skepticism is warranted. Any backtest evidence should be supported by out-of-sample evidence, robustness over time and across markets, economically intuitive explanations, and manageable trading costs. (We will explain below why style premia are better anchored by their historical performance than by starting valuations.)

Exhibit 6 shows plausible, conservative assumptions for two illustrative smart beta strategies — a value strategy and a multi-style strategy — and translates these to expected returns.

Exhibit 6 | *Building Expected Return Assumptions for Smart Beta Portfolios*

	U.S. Cap-Wtd	U.S. Value	U.S. Multi-Style
Information Ratio	0.0	0.25	0.45
Tracking Error	0.0%	5.0%	5.0%
Expected Gross Active Return	0.0%	1.3%	2.3%
Assumed Fee	0.0%	0.25%	0.35%
Expected Net Active Return	0.0%	1.0%	1.9%
Expected Real Return	**3.8%**	**4.8%**	**5.7%**

Source: AQR. The analysis is based on U.S. equity portfolios with various factor tilts. Data presented is based on hypothetical portfolios and are not representative of any AQR product or investment. Hypothetical performance results have certain inherent limitations, some of which are disclosed in the back.

Our hypothetical value-tilted (but still diversified long-only equity) portfolio has an expected real return of around 1% higher than the cap-weighted index, after fees. (In the last row we use as the base from Exhibit 1 the 3.8% expected real return for the U.S. cap-weighted portfolio.) The multi-style strategy — which we assume to include three highly complementary, "tried and true" strategy styles, notably value, momentum and profitability — is designed to maintain a similar tracking error and convert its superior diversification into a higher expected return.[22]

Finally, a *defensive* or low-risk equity portfolio may be assumed to have an expected return similar to that of the relevant cap-weighted index, but may achieve this with lower volatility.

Style Premia (Long/Short Alternative Risk Premia)

Style premia are one class of alternative risk premia (dynamic long/short strategies in liquid assets). They are not a main topic in this report but we provide some general comments. Style premia strategies apply similar tilts as the long-only smart beta strategies above but in a fully market-neutral fashion and often in multiple asset classes.

Because such long/short strategies can be invested at any volatility level, it makes sense to focus on Sharpe ratios and then scale them by the chosen volatility target to get ex-ante estimates of excess return over cash.

As always, we think expected returns are best assessed by some combination of historical evidence, theory and starting valuations. We already noted in the context of smart beta that a skeptical and conservative analysis of historical performance is the natural starting point. We prefer to focus on those styles with the most persuasive and pervasive evidence — notably value, momentum, carry and defensive — while being skeptical on more elaborate and perhaps over-fitted strategies.

Why do we anchor here less on starting yields than in our analysis of asset class premia? Because long/short style portfolios are dynamic, starting valuations may be the least useful input. We must compare current to historical valuations for the strategy with positions that evolve over time, not

[21] To list just a few, the style tilts may be industry-neutral or may permit industry bets, they may or may not be beta-neutral, and they may have different levels of tracking error. Different choices will result in differences in the *transfer coefficient*, a measure of how closely the final constrained portfolio can capture the underlying style factor. Beyond the strategy design, implementation efficiency and fees also affect net expected returns.

[22] These illustrative forward-looking information ratios (IRs) are lower than the historical numbers in Frazzini, Israel, Moskowitz and Novy-Marx (2013), *A New Core Equity Paradigm*. This AQR white paper shows, for U.S. large-cap stocks between 1980 and 2012, backtest IRs of 0.32 for Value (averaging simple 0.08 and smarter 0.56) and 0.91 for the 3-factor combination of value, momentum and profitability. Those IRs are gross of trading costs and undiscounted, unlike the forward-looking estimates shown in Exhibit 6 (we discount past net of cost returns for additional conservatism).

merely for the positions currently held. For example, the classic "value" long/short strategy involves buying cheap stocks (or other assets) against rich ones. We can track the *relative* cheapness of "value" stocks against other stocks — say, using price/book measures — compared to at other times in the past, to assess the tactical attractiveness of the value strategy. Starting yield is very important for stocks and bonds on a 5- to 10- year horizon as these are quite static portfolios, but ironically, while there may be some tactical (say 1-3 year) relevance for dynamic portfolios, the very dynamism makes style premia forecasting over a long term term less reliant on this same idea of starting valuation.

Empirical research shows limited predictability of style premia based on value-based tactical signals, and perhaps the least predictability for the most dynamic portfolios (such as the momentum style). Style timing seems at least as difficult as market timing, and in both cases there appears to be more empirical evidence for short-term momentum/persistence than for long-term mean reversion based on valuation. This remains an area of ongoing research in AQR. And we certainly track current valuations of style premia. There are many ways to compute them but, broadly, in the aggregate they look today somewhat rich to historical norms but not nearly as extreme as long-only asset classes. Thus, starting valuations are far less useful for style premia than for asset classes, but to the extent they are at all useful, their richness is far less severe.

For strategies with low correlations to each other, the case for strategic rather than tactical diversification is even stronger. A well-diversified strategic portfolio may be difficult to outperform by applying tactical tilts, since these will necessarily forgo beneficial diversification.

The degree of diversification is essential. Individual alternative risk premia (a single long/short style in a single asset class) might have similar forward-looking Sharpe ratios as market risk premia in asset classes (0.2-0.4), but a diversified composite of alternative risk premia (multiple styles applied across multiple asset classes) can have ex-ante Sharpe ratios of 0.7-1.0, net of trading costs and fees. In contrast, very few long-only portfolios may reach realistic ex-ante Sharpe ratios of 0.5-0.6. For alternative risk premia portfolios, it is plausible to assume a higher Sharpe ratio thanks to more-effective diversification (enabled by the use of techniques such as leverage and shorting, which can magnify any edge but which many investors are constrained from using), without assuming high standalone Sharpe ratios.

Long/short strategies are more implementation-sensitive than long-only portfolios. Cost-efficient implementation is essential when the expected Sharpe ratios of component strategies are quite low.

Conclusion

We began this report by highlighting the low expected returns in traditional asset classes. In conclusion we note that this concern may not apply to long/short strategies. The pervasiveness of low expected returns reflects the low level of riskless real yields which serve as (part of) discount rates for all long-only investments. In market-neutral long/short strategies, the real rate effects in long and short legs wash out. This means that the richness of long-only assets need not carry over to long/short strategies and that the latter may be less vulnerable to any increases in real yields. (Indeed, our empirical analysis supports this notion.[23])

Warning: this is the most AQR-centric paragraph in this piece. The message we take away from all the above is not to time the market aggressively but make sure to use reasonable (i.e., lower) expectations for asset class returns, and — here's the AQR-centric part — while we generally believe in long-only tilts toward certain styles, and in long/short implementation of them if possible, and while there will certainly be periods of disappointment, these look far more like their historical norms than do traditional markets, and if anything deserve a bit more consideration than usual.

[23] See *Alternative Thinking* 2014Q2: "Should Investors Worry About Rising Real Yields?"

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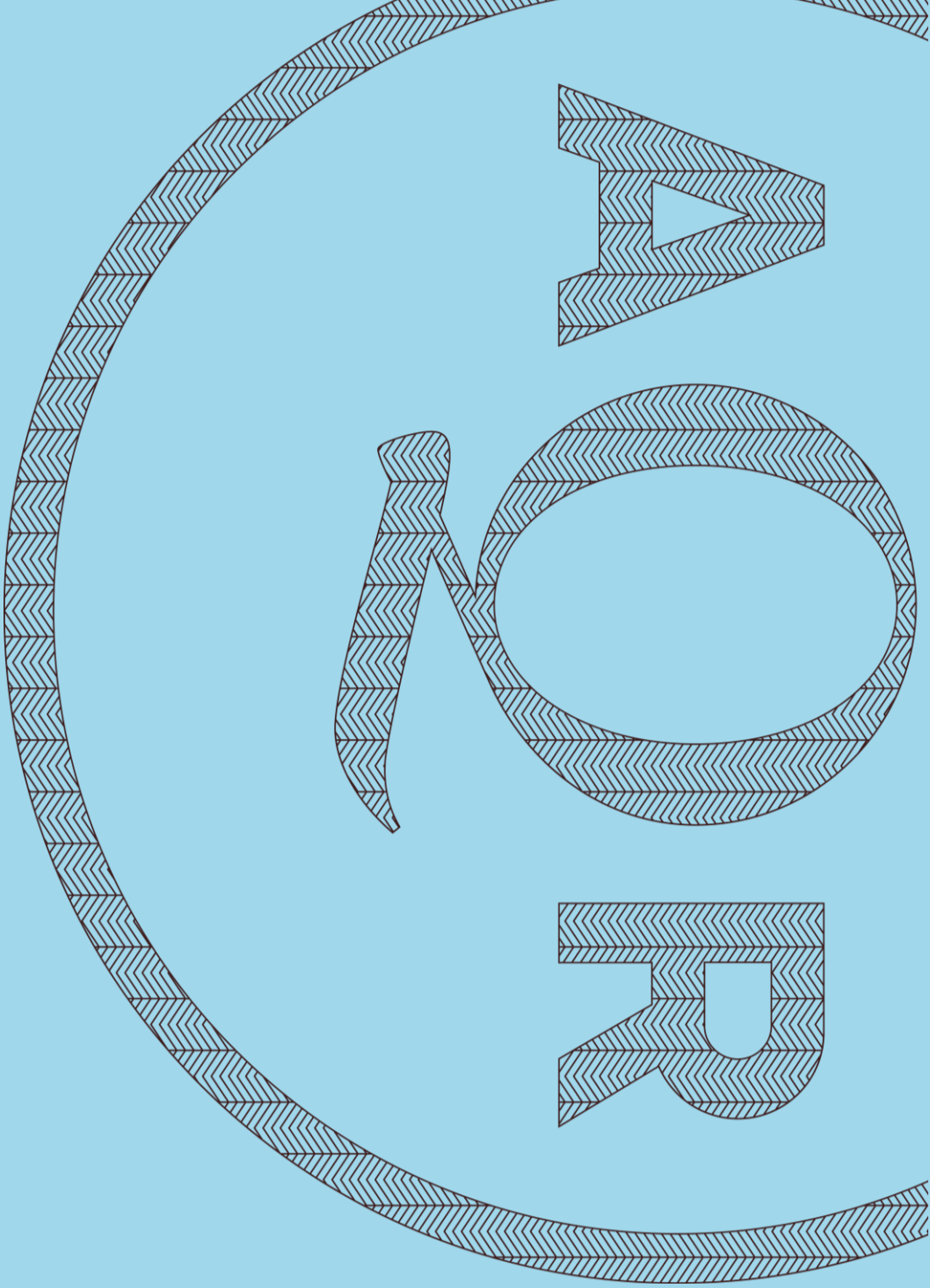

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