



# The Risk Forecast for 2014

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It's the time of year when market pundits take to the notoriously difficult task of forecasting returns. Volatility is equally important, however, and it can be predicted much more reliably than asset-class performance. My forecast shows that the options market is underestimating risk in 2014, giving investors an opportunity to purchase portfolio protection at attractive prices.

At the start of 2013, I published an outlook for risk for a range of core asset classes. In this article, I revisit these predictions, examine their accuracy and provide a new risk outlook for 2014.

My risk forecast is based on the prices of options on ETFs representing a series of core asset classes. Options prices provide the best forward-looking estimate of future volatility in the same way that insurance prices should provide the best estimates of the risks of an insured outcome. Options prices are not a perfect forecast of future risk, but they are the market's consensus view of expected future risk. More details about my methodology are provided in last year's article.

In many ways, 2013 was an excellent laboratory for examining the effectiveness of options prices as predictors of risk. Stocks delivered their best year since 1996, with SPY up by more than 31%, but bonds and gold suffered substantial declines. Long-term Treasury bonds (TLT) fell by more than 13% (including interest payments) and gold (GLD) has declined by more than 27% in 2013. Of the other major asset classes that I surveyed in last year's piece, Brazilian equities (EWZ) suffered the most, with a decline of 17.5%.

Along with the substantial gains in U.S. equities, the VIX (which measures the volatility on the options nearest to expiration) dropped from more than 30% over the last year, going from 18% at the close of 2012 to 12.3% at the end of December of 2013.

## Basics of risk projections

There are three approaches to estimating expected risk. The first looks at trailing risk: Asset classes that have been risky tend to continue to be risky, and vice versa. The second approach is to look at option-implied volatility. A major component of the value of a put or call option is the assumed level of volatility of the underlying asset. Using an option-pricing model (such as Black-Scholes), you can back out the volatility of the underlying asset from the option price.

In the simplest model, the range and probability of positive moves in asset prices are assumed to be

symmetric with negative moves. In practice, however, this is not the case. Investors tend to have an asymmetric view of volatility — upside surprises are of less concern than downside surprises. For this reason, I measure downside risk by looking at the implied volatility of at-the-money put options. This provides the cost of hedging against losses for an asset.

In looking at the implied volatilities across asset classes, it is very helpful to know whether risk is being priced consistently. I test this by calibrating Quantext Portfolio Planner (QPP), my Monte Carlo model, so that the expected volatility for the S&P 500 matches the implied volatility on put options on SPY. The expected volatility of the S&P 500 is used to project volatility for all of the other asset classes. I then compare the model-projected volatilities to the implied volatilities of put options on ETFs for each asset class.

The third approach to estimating expected risk is to use the Monte Carlo simulations to combine historical risk and correlations across asset classes. Rather than simply relying on the trailing volatility of each asset class, these projections incorporate the risk relationships between asset classes so that the projected risk for each asset class is consistent with its relationships to other asset classes. In this way, we can see whether one asset class' implied volatility appears to be too low (the market appears to be complacent) or too high (the market appears to be risk-averse). This approach has proven useful, allowing investors to purchase or sell “insurance” depending on its price.

### **Reviewing last year's risk projections**

Before looking at risk projections for 2014, I will compare the risk projections from one year ago to what actually occurred. The table below shows my projections from a year ago.

***Trailing, implied, and projected volatility for major asset classes for 2013 (table from last year's article)***

Asset Class	Ticker	Trailing 3-Year Volatility	Put Implied Volatility	QPP Projected Volatility
S&P 500 Index	SPY	15%	18%	18%
EAFE Index	EFA	20%	21%	22%
MSCI Emerging Mkt Index	EEM	24%	22%	25%
Long-Term Treasury Bonds	TLT	16%	16%	19%
High-Yield Bond	HYG	10%	12%	11%
Brazil Stocks	EWZ	29%	24%	29%
REITs	ICF	19%	20%	23%
China Stocks	FXI	24%	25%	28%
Gold	GLD	19%	17%	23%

There was a high level of agreement between historical and implied volatility, with a couple of exceptions. The one-year implied volatility for the S&P500 (SPY) was 18%, as compared to the trailing three-year volatility of 15%, suggesting that the options market projected elevated risk in 2013. This did not occur, with the VIX (which is a very short-term measure of volatility) falling to 12.3% and the trailing three-year volatility for the S&P 500 falling to 12.45% at the end of 2013.

While the general agreement between the simulated projected risk and the implied volatility was very good, there were a number of outliers. Most notable was the high projected volatility for gold (GLD). The trailing three-year volatility for GLD was 19% and the implied volatility for GLD was 17%, suggesting a slightly decline in downside risk for the coming year. The projected volatility was 23%, suggesting higher risk for the coming year relative to both the past three years and the put implied volatility.

While the implied volatility for long-term Treasury bonds (represented by TLT) was equal to the trailing three-year volatility, the projected volatility for TLT was somewhat higher. Given that 2013 was incredibly bad for Treasury bonds, the elevated risk projection was a good one.

For Brazilian equities (EWZ), Chinese equities (FXI) and the MSCI emerging markets index (EEM), the simulated projected volatilities pointed to higher risk in 2013, as opposed to the implied volatilities, which suggested lower risk in 2013.

How well did the risk outlook from last year perform?

The risk outlook for the S&P 500 derived from implied volatility was not a good predictor for 2013. Implied volatility suggested that volatility would be higher, but realized volatility was substantially lower, with the VIX dropping substantially over the course of the year.

***Projected volatility for 2013 (from last year's article) vs. actual volatility in 2013***

Asset Class	Ticker	Projected Volatility for 2013	Realized Volatility in 2013
S&P500 Index	SPY	18%	11%
EAFE Index	EFA	22%	14%
MSCI Emerging Mkt Index	EEM	25%	18%
Long-Term Treasury Bonds	TLT	19%	13%
High-Yield Bonds	HYG	11%	6%
Brazil Stocks	EWZ	29%	21%
REITs	ICF	23%	16%
China Stocks	FXI	28%	22%
Gold	GLD	23%	22%

Realized volatility in 2013 was lower than forecast for every asset class, but the relative-risk projections were useful. Long-term Treasury bonds were more volatile than the S&P 500, as the projections suggest, but the absolute levels of volatility for both TLT and SPY were lower than projected, for example. There was a 93% correlation between the projected and realized volatilities across the asset classes.

Now, let's turn to the question of whether last year's risk projections were accurate in predicting 2013 performance.

***Projected volatility minus implied volatility in January 2013 and subsequent 2013 return***

Asset Class	Ticker	Projected Volatility - Implied Volatility	2013 Return
EAFE Index	EFA	1%	21%
MSCI Emerging Mkt Index	EEM	3%	-3%
Long-Term Treasury Bonds	TLT	3%	-14%
High-Yield Bonds	HYG	-1%	6%
Brazil Stocks	EWZ	5%	-18%
REITs	ICF	3%	-1%
China Stocks	FXI	3%	-2%
Gold	GLD	6%	-27%

The difference between projected volatility and implied volatility from last year's outlook was a fairly good predictor of asset-class returns in 2013. Asset classes for which the projected volatility was markedly higher than implied volatility fared poorly. The options market underestimated the risk on gold, Treasury bonds and Brazilian equities. Given the enormous drop in gold prices and in Brazilian equities in 2013, this outlook provided a useful warning.

The simulations also suggested that emerging markets were riskier than the options markets implied. While Chinese equities and the broader emerging markets have returned modest losses, Brazil has declined substantially. In light of the massive rallies in almost every other equity asset class, the projection of higher risks for emerging markets was a successful one.

Similarly, while real-estate investment trusts (REITs) ended the year with a 1% loss, the uncertainties around Fed policy this year resulted in some massive swings. The iShares Cohen and Steers REIT ETF (ICF) dropped from a high of \$91.3 in May to a low of \$73.8 in August.

#### **Risk outlook for 2014**

The current trailing three-year implied and projected volatilities (through December 2013) for these same asset classes show that risk expectations have decreased in the last year. The trailing three-year volatility for the S&P 500 through 2012 was 15%, compared to the trailing three-year volatility at the end of 2013 of 13%. There were similar declines in the three-year volatilities for other asset classes, with the notable exception of gold. Even long-term Treasury bonds have a trailing three-year volatility

that is lower today than it was one year ago, despite the fact that this asset class took a major hit last year.

***Historical, implied and projected volatility for major asset classes for 2014***

Asset Class	Ticker	Trailing 3-Year Volatility	Put Implied Volatility	QPP Projected Volatility
S&P500 Index	SPY	13%	17%	17%
EAFE Index	EFA	17%	18%	20%
MSCI Emerging Mkt Index	EEM	20%	23%	23%
Long-Term Treasury Bonds	TLT	14%	18%	21%
High-Yield Bonds	HYG	7%	18%	9%
Brazil Stocks	EWZ	27%	27%	27%
REITs	ICF	17%	20%	17%
China Stocks	FXI	23%	25%	34%
Gold	GLD	22%	21%	30%

Similar to last year, the implied volatilities are higher than the trailing volatilities. The implied volatilities shown here are for at-the-money put options expiring in January 2015, except for ICF, for which the longest-dated options expire in August 2015.

The implied volatilities for most asset classes for 2014 are quite consistent with projected volatilities and historical volatilities. High-yield bonds and gold show the largest disparities.

How much have the different measures of volatility changed over the course of one year? To begin, I compare implied volatility for each asset class from a year ago to the current implied volatilities.

***Option-implied volatility for 2013 vs. 2014***

Implied Volatility			
Asset Class	Ticker	2013	2014
S&P500 Index	SPY	18%	17%
EAFE Index	EFA	21%	18%
MSCI Emerging Mkt Index	EEM	22%	23%
Long-Term Treasury Bonds	TLT	16%	18%
High-Yield Bonds	HYG	12%	18%
Brazil Stocks	EWZ	24%	27%
REITs	ICF	20%	20%
China Stocks	FXI	25%	25%
Gold	GLD	17%	21%

The high level of consistency in implied volatilities is notable. Since the equity market rose dramatically and the VIX has dropped substantially, the market's outlook for volatility across most asset classes is considerably higher.

One notable difference in implied volatilities compared to last year is in high-yield bonds (HYG). HYG is relatively illiquid, but the implied volatilities today and a year ago are much higher than the realized volatility for HYG over the past three years. That spread has been persistent all year. The primary risk in high-yield bonds is from default, and the relatively high price for put options on HYG suggests this risk is elevated in the year to come. This is reasonable, because default rates have been very low in recent years. The substantially lower projected volatility for HYG suggests that a continued low volatility for high yield is more consistent with an implied volatility of 17% for equities (SPY), given the typical correlations between equities and high-yield bonds.

***Projected volatility for 2014 vs. 2013***

QPP Projected Volatility			
Asset Class	Ticker	2013	2014
S&P500 Index	SPY	18%	17%
EAFE Index	EFA	22%	20%
MSCI Emerging Mkt Index	EEM	25%	23%
Long-Term Treasury Bonds	TLT	19%	21%
High-Yield Bonds	HYG	11%	9%
Brazil Stocks	EWZ	29%	27%
REITs	ICF	23%	17%
China Stocks	FXI	28%	34%
Gold	GLD	23%	30%

The volatility of most major asset classes will be similar to that in 2014. The prominent exceptions are gold (GLD) and Chinese equities, for which the projected volatilities are higher for 2014 than they were in 2013.

The difference between implied volatility on put options and projected volatility has provided useful insights as to which asset classes are most likely to experience large moves. Let's see what the data say for 2014.

***Projected minus implied volatility for 2014***



2014		
Asset Class	Ticker	Projected Volatility - Implied Volatility
EAFE Index	EFA	2%
MSCI Emerging Mkt Index	EEM	0%
Long-Term Treasury Bonds	TLT	2%
High-Yield Bonds	HYG	-9%
Brazil Stocks	EWZ	0%
REITs	ICF	-2%
China Stocks	FXI	9%
Gold	GLD	9%

The projections suggest that the asset classes that are most likely to surprise investors with a volatility shock are gold and Chinese stocks, while real estate and high-yield bonds are most likely to be less risky than the options markets suggest.

## Final Thoughts

I have compared three risk measures — trailing three-year, option-implied and projected volatilities — for a series of core asset classes. The major features of last year's risk outlook were implied volatilities that were higher than in previous years but reasonable by historical standards. You could buy downside protection at reasonable prices and, in the case of gold, at very attractive prices, given other measures of risk. The projected volatility from last year for GLD was 23% (see table above), compared to the implied volatility of 17%. The price of a put option on GLD was much lower than the projected volatility indicated it should be. Given the decline in gold, this was useful guidance.

The same situation existed for Brazilian equities (EWZ) and, to a lesser extent, long-term Treasury bonds (TLT), REITs (ICF), Chinese equities (FXI) and emerging markets in general. Given the implied volatility for the S&P 500 as compared to the projected risk, the risk potential in all of these asset classes was predicted to be higher than the options markets were pricing these risks.

For 2014, options on the S&P 500 index (SPY) have implied volatility of 17%, which is very consistent

with historical standards but much higher than the volatility in recent years. The spread between implied and realized volatility in recent years suggests the potential for a sudden increase in volatility. This spread is higher than it was last year (4% vs. 3%), as the tables above show.

You can purchase downside protection in the form of put options more cheaply than you could last year, but these options are expensive compared to volatility over the past several years and the last 12 months. It is one of the abiding ironies of bull markets that you can buy downside protection ever cheaper the longer the rally continues. For those who want to lock in some of their gains in equities over recent years, such protection is reasonable.

By way of example, you can buy a put option on SPY expiring in January 2015 with a strike of \$165 for \$6.50. This option covers all losses exceeding 10% of the current value of SPY from now until January 2015, and the cost of this option is only 3.6% of the current price. The decrease in the cost of put options was even greater for EAFE stocks (EFA). You can buy a January 2015 put option on EFA with a strike of \$59 for \$2.60. This option covers any losses worse than 10.6% for the current value over the next year, and the cost is 3.9% of the current value.

***Prices of put options to limit losses to 10% of current value***

Ticker	Current Price	Strike	Offer Price for Jan 2015 Put Option	Option Price as a Percentage of Current Price
SPY	\$182.90	\$165.00	\$6.53	3.6%
EFA	\$65.98	\$59.00	\$2.56	3.9%
FXI	\$36.70	\$33.00	\$2.23	6.1%
GLD	\$119.29	\$105.00	\$4.60	3.9%

A comparison of projected and implied volatility suggests that the two major uncertainties are China and gold. The model-projected risk for these two asset classes is much higher than the implied volatilities. For portfolios with exposure to these two asset classes, it is a good time to buy protection. You can cap losses on FXI at a maximum of 10.1% with a January 2015 put option with a strike price of \$33 for \$2.20, which equates to 6.1% of the current price. Finally, and notably, you can buy a January 2015 put option on GLD with a strike of \$105 for \$4.60, which equates to 3.9% of the current price of GLD. These are offer prices of these put options as of Jan. 3. On the basis of my projected volatility levels, these options prices are low.

High-yield bonds are the most surprising divergence from last year to today. The implied volatility on HYG is markedly high compared to recent years and to its projected volatility. As prices on high-yield bonds have risen (and yields have fallen), it is reasonable that investors would seek explicit downside protection.

Overall, option-implied volatilities suggest that volatility of major asset classes will increase over the next year. As markets rise, investors will seek to lock in their gains by purchasing put options, which will increase the prices of options and implied volatility. For investors seeking downside protection, the prices of put options are currently attractive for most asset classes.

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