Volatility is not Risk and VIX is of Limited Use

Vinay Nair[1]
February 2017

[1] V. Nair is the founder of 55ip, and a visiting professor at MIT Sloan School of Management and The Wharton School at the University of Pennsylvania.

Volatility is not Risk and VIX is of Limited Use

To an investor, risk is the possibility of facing losses. This likelihood of loss exists because of future uncertainty. The most widely used measure to capture this uncertainty is VIX, a measure of implied volatility of S&P 500 index options calculated by the Chicago Board Options Exchange (CBOE). It represents the market's expectation of stock market volatility over the next 30-day period. VIX, however, is a faulty measure of the true risk and the likelihood of losses an investor faces.

For the purposes of an investor who seeks to adjust their exposure to markets based on expected risk, interpreting VIX as risk is too specific and incomplete at best, and conceptually flawed at worst. Here are some reasons:

1. **Measurement of risk has various aspects to it that the VIX fails to address.**

   Risk is specific to the investor's horizon. The likelihood of losses next day may differ from the likelihood of losses in the next month, quarter or year. Any measure should be consistent with the investor's investment strategy and horizon. VIX is a measure of the volatility of daily returns. For example, it makes little sense for a long-term investor to decrease their allocation because the volatility on the next day is likely to be high.

   Return distributions are not as well behaved as we thought when Modern Portfolio Theory was introduced. Volatility is an incomplete characterization of the future return distribution since returns may not be symmetric. Risk should be more conscious of downside uncertainty.

   VIX is a measure derived from the options market. This is specific to the immediate perception of the future uncertainty by options market players. This may not capture the uncertainty being reflected in other markets. A more complete measure would look across all major asset classes and financial instruments such as different equity markets, bond markets, commodities, and currencies.

   VIX is a technical measure based on the views of current market participants. As a result, it can only capture the uncertainty due to factors that are in the market's immediate attention. Risk can, however, exist due to fundamental reasons that the market may not be focused on. For example, the same VIX but at entirely different valuation levels (say in 2003, after the market sell-off and in 2007, before the great financial crisis) present a very different risk to investors.

2. **VIX fails to address the distinction between risk and opportunity.**

   VIX can indeed provide an investor a piece of the picture about future volatility, but not of future expected returns. VIX may not translate into avoidable risk since some sources of uncertainty are rewarded in markets, while others are not. Much like cholesterol, uncertainty comes in good and bad varieties. Characterizing the future uncertainty as risk or an opportunity, however, requires understanding the type of uncertainty.

   Savvy investors can avoid unrewarded uncertainty and embrace rewarded uncertainty. While the former represents risk, the latter represents opportunity. For example, market volatility driven by value stocks suggests an opportunity while the same volatility driven by growth stocks suggests a risk.

3. **VIX may provide the wrong guidance for an investor who seeks to buy protection from possible losses.**

   Note that VIX captures future uncertainty already on the market radar (since the measure itself is derived from short-term market action). As a result, the price of protection from this uncertainty may be expensive. For an investor, who wishes to measure risk and then buy protection, the final course of action depends on both the risk and the price of protection. In fact, holding onto the risky asset may indeed be sensible if the

price of insurance (such as options) is very high. Conversely, it may be beneficial to sell the insurance (rather than buy) if the price of insurance is indeed very high. Thus, a high measure of VIX accompanied by a high price of protection may counter-intuitively recommend accepting the risk exposure.

55ip Market Risk Indicator (MRI)

To solve the limitations of VIX and provide a more meaningful measure of market risk (not just volatility), 55ip created and uses the Market Risk Indicator (MRI). It takes a systematic approach to quantifying risk. The 55ip MRI helps determine when to avoid risky asset classes. If the measure is high, it directs a shift out of equities into less risky asset classes such as cash or cash equivalents.

The 55ip MRI enhances the measurement of uncertainty (addressed in section 1 above) by attempting to characterize the type of uncertainty (section 2) and the price of the protection from the uncertainty (section 3) to determine conditions where markets pose high intermediate (monthly) risk – or likelihood of future monthly losses.

Examining data from April 1, 2004 – December 1, 2016, shows the improvement that the 55ip MRI provides (see below).

First, it is true that VIX does predict the daily volatility in next month's returns. The regression coefficient of VIX on next month's volatility is significant as shown below.

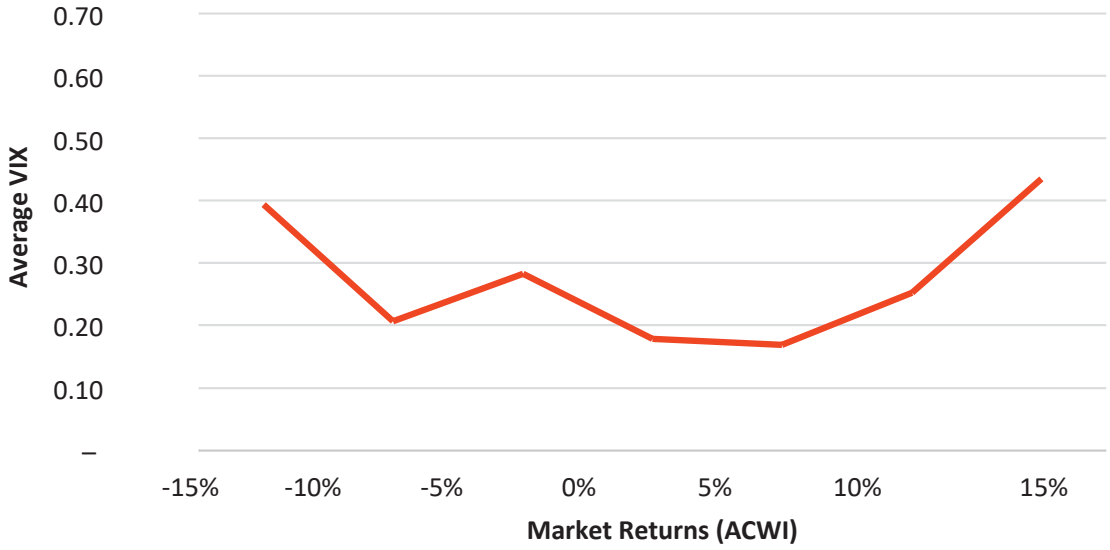
	Coefficient	T statistic
VIX	22.7%	14.17
constant	-0.5%	-1.45

However, as discussed, daily volatility is not risk.

When we try to predict intermediate risk – likelihood of losses next month – with VIX, we find that VIX provides no guidance. Future monthly returns are unrelated to levels of VIX and VIX does not predict true risk – likelihood of a loss next month. A logistic regression that aims to predict the likelihood of a loss next month shows that VIX has no predictive ability.

	Coefficient	Z statistic
VIX	1.34%	0.69
constant	-0.57%	-1.37

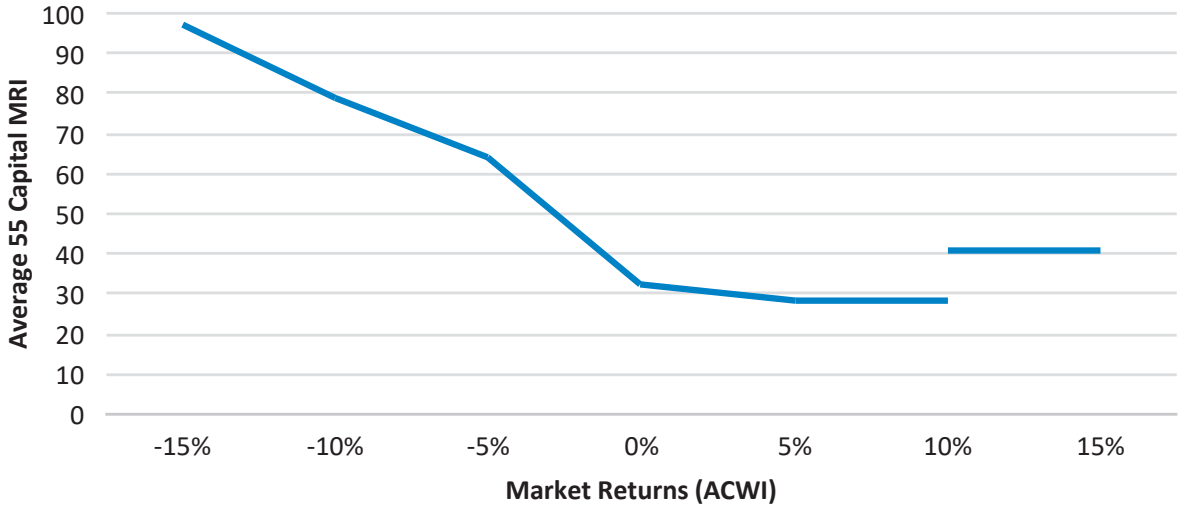
This can be seen more clearly in the graph below. The graph plots the average values of VIX (y-axis) for different levels of the following month's market returns (ACWI) (x-axis). As can be seen, both high and low future returns are associated with high levels of VIX. VIX captures uncertainty but not risk.



However, the 55ip MRI does provide guidance on likelihood of future losses. A logistic regression that aims to predict the likelihood of a loss next month shows the 55ip MRI is significant.

	Coefficient	Z statistic
MRI	1.49%	2.11
constant	-0.84%	-2.73

Again, this can be seen more clearly in the graph below. The graph plots the average values of the 55ip MRI (y-axis) for different levels of the following month's market returns (ACWI) (x-axis).



Using the 55ip MRI provides long-term investors a valuable tool for risk forecasting. At 55ip, we use the 55ip MRI and other insights to generate portfolios with downside protection across equities, asset allocation and macro strategies.

55ip
617-960-9559
www.55-ip.com

BOSTON
One Liberty Square, Suite 200, Boston, MA 02109

NEW YORK
12 East 49th Street, 11th Floor New York, NY 10017

MUMBAI
Aston Building, 10th Floor Shastri Nagar,Andheri (W,
Mumbai 400 102, India