

Market Insight

Risk Management and Macroeconomic Uncertainty: Short-term Consequences of Long-term Risk

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October 2012

Abstract:

Despite healthy returns in global equity markets through most of 2012, the investment environment remains uncertain. The daily VIX suggests that risk levels have declined, yet estimates of the equity risk premium suggest higher levels of uncertainty. How can investors reconcile these two signals? In this paper, we explore reasons for discrepancies between these two signals, and suggest that these reasons present challenges for both the measurement and management of risk. We propose that many of these risk management challenges can be resolved by focusing on understanding the drivers of valuation.

Why This Matters:

- Risk management depends on our ability to understand risk measurement regardless of horizon.
- Many short-term risk measurement challenges depend on the resolution of long-term uncertainty.
- Practical risk management depends on our ability to systematically reconcile these issues.

Introduction

Despite healthy returns in global equity markets through most of 2012, most investors and risk managers would agree that the investment environment continues to be uncertain. While indicators such as the daily VIX seem to suggest that risk levels have declined, other indicators, such as the equity risk premium, are consistent with higher levels of market risk. Additionally, investors are trying to parse macroeconomic events that include:

- Reconciliation of fiscal and monetary policy in Europe and the implications for the Euro;
- How fiscal balances will be restored in the US;
- The implications of inventory accumulations in China.

What do these macroeconomic issues have in common? First, they have few precedents; second, they have the potential for producing conflicting signals in models and data; and third, they have the potential for significant adverse effects on portfolio values at both short and long horizons. In short, these are risk management issues. As such, these issues should induce risk managers to take three steps:

1. Re-examine the precise role that risk measurement tools play.
2. Reconsider the requirements placed on risk models.
3. Review the risk management process.

Because many of these events have no historical precedent, it is worth asking if practitioners have the appropriate tools for the risk management problems at hand. After all, the risk manager's function is to quantify the range of potential losses in a portfolio, identify reasons why those losses may occur, and to find strategies that might mitigate those losses. Especially in today's environment, risk management professionals need to re-examine their risk management processes. Augmenting the risk management process with a better understanding of the drivers of valuation will help identify the main drivers of portfolio risk and consequently, inform the development of risk-mitigation strategies.

What Has Driven Risk Management in the Past?

The "industry" of risk management in financial services is relatively young.¹ The principal driver of the development of risk management was a demand by banks to systematically identify and quantify the potential range of losses in their trading books. Since trading books inherently have short horizons, risk managers had no natural incentive to worry about either the quantification of risk over longer horizons or the impact of macroeconomic trends. The evolution of good governance practices induced longer horizon investors (e.g., pension funds) to adopt the risk management discipline used by banks.

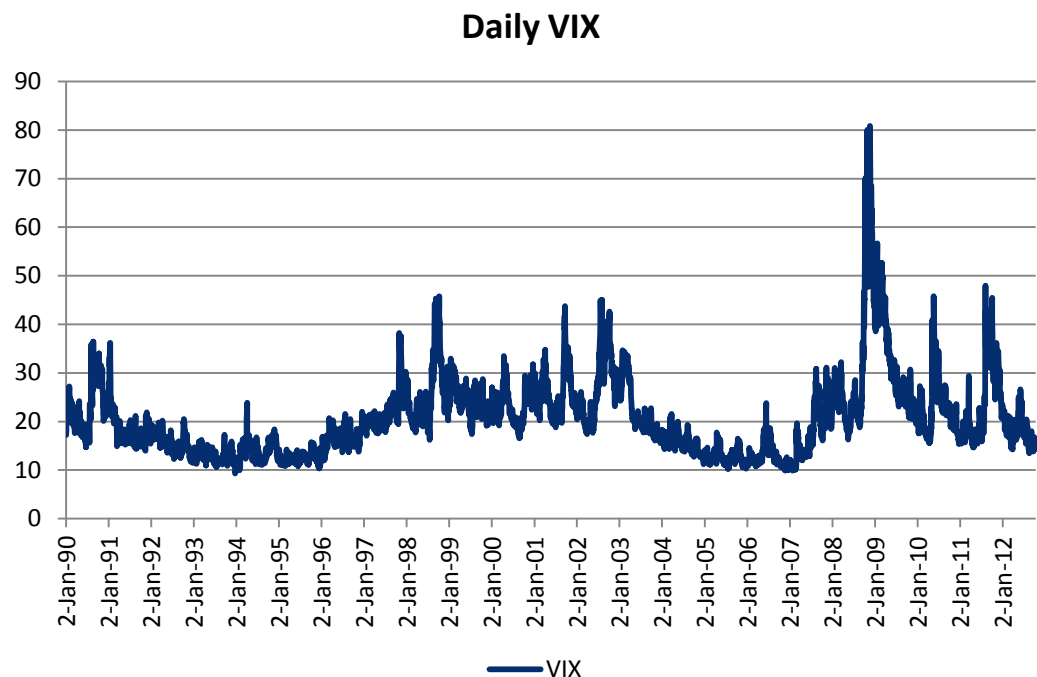
¹ An early reference work on risk management in financial services is [The Practice of Risk Management](#) (1998).

For most of their history, risk management practitioners have focused on the measurement of risk. It has become possible to produce detailed risk analyses through the wide availability of high frequency data, sophisticated statistical techniques and cheap computational power. For example, Value-at-Risk calculations now incorporate elegant option pricing models applied to complicated structured products. In many respects, the ability of risk managers to measure portfolio risk has never been better.

Getting Comfortable with Two Different Signals

Despite the precision with which risk can be calculated, practitioners are uneasy about the application of these tools in today's uncertain environment. An example of this discomfort can be seen by comparing two pieces of information: the level of the VIX (shown in Figure 1) and the level of the equity premium (shown in Figure 2).

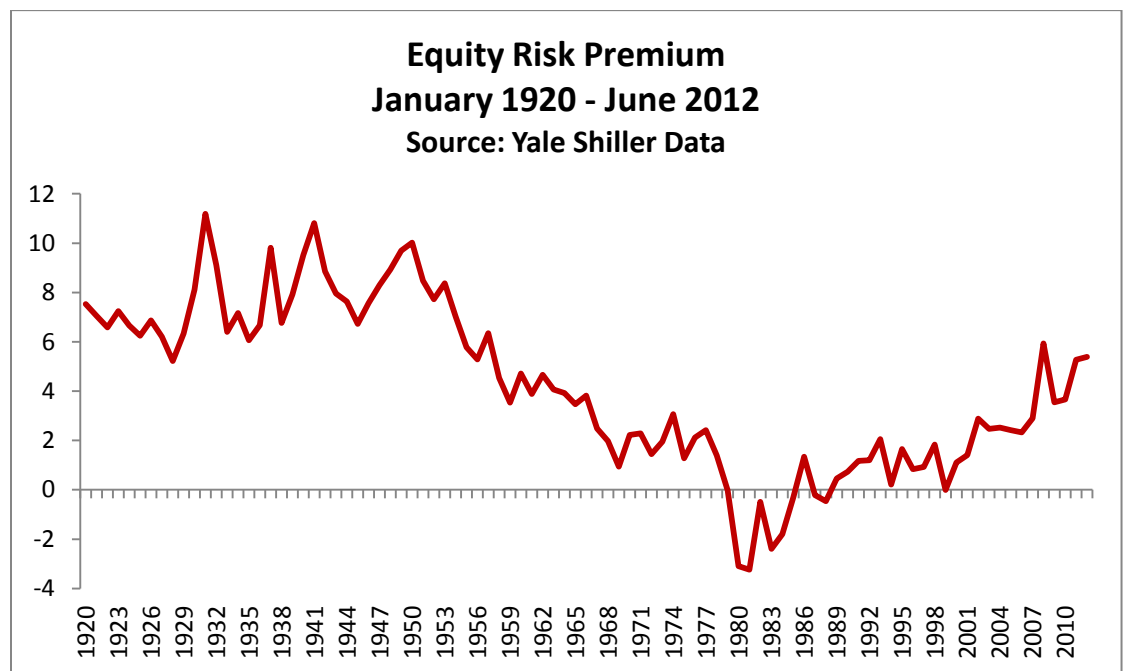
Figure 1: The Daily VIX is near Pre-Crisis Levels.



Since the VIX is driven by observed option prices corresponding to short- to-intermediate horizons, market participants treat the VIX as the market's view on the level of volatility. Since it is calculated using basic option pricing models, it explicitly eliminates the role of expected returns. High levels of the VIX are generally interpreted as showing that the market faces more uncertainty, while low levels of the VIX are usually interpreted as indicating higher investor confidence. Clearly we would anticipate that the VIX will vary over time, as is shown in Figure 1. The Exhibit reveals that the VIX is significantly lower than the highs seen during the financial crisis — in fact, the VIX is nearly back to its pre-crisis levels. This indicator suggests that uncertainty has subsided.

The equity risk premium shows the price, in terms of extra expected return (relative to risk-free rates), that market participants require to justify exposure to the equity market. Since it cannot be observed directly, the equity premium must be estimated using a valuation model that extends to longer horizons.² In contrast with the VIX, the horizon for the equity premium is longer, and expected returns are explicitly considered. Higher levels of the equity risk premium correspond to higher levels of long-run uncertainty, while lower levels of the equity risk premium suggest that investors do not need as much compensation for the long-run risk of equities. The time series for the equity premium shown in Figure 2 suggests that uncertainty has not subsided to its pre-crisis levels.

Figure 2: The Equity Risk Premium Moves Slowly.



These two exhibits show the conundrum facing risk managers: here are two signals about market conditions with opposing conclusions about levels of uncertainty, and, different signals about the potential for losses in value. The levels of the VIX suggest that over short horizons, investors do not face significant amounts of equity risk, as measured in terms of potential loss. The equity premium suggests that over longer horizons, investors face significant uncertainty for which they need significant compensation. The issue facing investors and risk managers is whether and how to incorporate the insights from long-horizon valuation models into short horizon risk management problems.

² The time series of the equity premium shown in Exhibit 2 was estimated using a dividend-discount model and using the methodology shown in Jagannathan, McGrattan and Scherbina (2000).

Risk management practitioners can reconcile these disparate signals through a re-examination of three specific issues: the role of risk measurement tools, the role of models, and the overarching structure of the risk management process. Let's look at each of these in turn.

Central to the risk management process is a set of risk measurement tools that should produce risk statistics for the investor's portfolio. The tools should include both basic statistics such as VaR (and its various permutations) and should identify the main drivers of portfolio risk. There are four characteristics that a risk measurement tool must satisfy in order for it to be useful to investors and risk managers:

1. The asset coverage must include all of the assets that the investor holds in their portfolio.
2. The processing speed must be sufficiently responsive to the investor's risk management, and investment decision-making processes.
3. The reports generated by the tool must have the proper level of parsimony, supporting risk management and investment decisions by presenting sufficient but not excessive detail.
4. The modeling process must be transparent to the risk manager and the investor.

This last point raises the second issue that confronts risk managers today — the clarity of modeling portfolio risk. Understanding the risk of portfolios with a diverse set of holdings requires models to reduce the dimensionality of the analytic problem. For example, understanding the sources of risk in a portfolio with 1,000 securities becomes much easier when each security can be represented as exposures to thirty factors. Thus, the demand for reducing the dimension of the analytic puzzle induces a demand for risk models.

Most risk management professionals are well aware that risk models are simply alternate expressions of valuation models. Simple valuation models (regardless of asset class) rely on projections of cash flows and measurement of discount factors, and can be used to produce theoretical (or model) valuations for the asset or security under analysis. Comparison of theoretical valuations with actual prices can indicate whether an asset is rich or cheap. And, in many respects, the same exercise, with the same valuation model, can be done with risk levels.

Improvements in risk models over the past 25 years have come through the use of higher-frequency data. These advances have been consistent with the broader availability of higher-frequency data, the steadily decreasing cost (and increasing speed) of computational power, and the development of more sophisticated tools for statistical analysis. Through 2007, they have been consistent with a relatively benign global macroeconomic environment. Consequently, risk management practitioners had no reason to consider whether changes in macro conditions had induced changes to the valuation models underlying their risk models.

Conclusion

Today's market environment is different, however. Because long-term macroeconomic uncertainties are pervasive, investors and risk managers alike should ask whether there have been fundamental changes to the valuation models that provide the foundation to their risk models. For example, does increased macroeconomic uncertainty change the structure of the discount function? Do major shocks to the economy alter the growth in asset cash flows? How does short-term risk management account for the pervasiveness of long-term macroeconomic uncertainties? And do long-term macroeconomic risks affect the production of short-term alpha?

Since resolution of these types of questions is likely to be revealed only over long horizons, the risk manager must look to extend the organizational reach of the risk management function. For example, risk managers should engage the organization about its level of risk tolerance, with a view to connecting the level of portfolio risk to broader organizational objectives. Equally important, they should deepen their understanding of the processes used for investment decision-making.

In pursuing these goals, risk managers will need to confront the tension between short-term risk levels and long-term macroeconomic uncertainties that is captured by Figures 1 and 2. That tension manifests itself most directly in the form of risk models that support the analysis of the principal channels of short term risk. A natural tendency for risk managers is to rely more heavily on stress tests. However, to make full use of stress tests, risk managers will need to understand how the stress events affect the structure of the particular model that they are using. To achieve this, risk managers and investors will need to make fuller use of a valuation framework. In particular, this valuation framework should be one that allows the investor to gain insight into the short-term consequences of long-term risk.

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¹As of June 30, 2011, based on eVestment, Lipper and Bloomberg data.