

WEEKLY MARKET MONITOR AUGUST 20, 2007

BRETT HAMMOND
CHIEF INVESTMENT
STRATEGIST

LEO KAMP
CHIEF ECONOMIST

DOUGLAS FORE
DIRECTOR OF PORTFOLIO
ANALYTICS

MARKETS REPRICING RISKS GLOBALLY

Financial markets world-wide are currently repricing risks. This repricing of risks has led to widespread reductions in the leverage employed by market participants. The reduction in leverage has been at times voluntary and at times involuntary. Certain market participants — typically those who have experienced large losses — have claimed that recent market movements were totally unpredictable or so rare as to be vanishingly improbable. This is not true, as we will explain.

- What led to the global repricing of risks?
- What are the implications of a global liquidity shock?
- How frequent are such “rare” events.

For the last several years global financial markets have, as a common theme, reduced the prices demanded for risks. This has been reflected in the historically low credit spreads investors have demanded over securities such as default-free U.S. Treasury bonds. This has also been reflected in investor demand for an array of financial products such as collateralized debt obligations (CDOs) whose underlying assets are sub-prime mortgages. Although the originating assets for these sub-prime mortgages consist of residential real estate in the U.S., once these sub-prime mortgages are packaged together — securitized — they are sold to investors all over the world. The advantage of this financial innovation is that risks can be distributed throughout the global financial system and held by the specific investors — whether they are in San Francisco or Singapore — who wish to bear these risks. A downside of our integrated global financial markets, however, is that shocks to the system are transmitted globally with much greater speed than was the case years ago.



This year, as the default rate increased on sub-prime mortgages in the U.S., investors reacted by marking down — lowering the price at which they were willing to buy — securities backed by these assets. In addition, other securities backed by many types of risky assets began to be marked down as well. This resulted in credit spreads widening. It is important to note, however, that credit spreads have only just now returned to historically normal levels. In other words, the extremely low credit spreads of the recent past may be seen as the anomaly and the higher credit spreads we see today may be seen as a return to normal conditions.

The repricing of risks globally has also been accompanied by a change in global liquidity. Many market participants have reduced the amount of leverage employed — the amount they're willing to borrow — as part of their trading strategies. This reduction in leverage has at times been voluntary in response to losses, as leverage magnifies losses as well as magnifies gains. The reduction in leverage has at times also been involuntary, as some market participants have discovered that counterparties were no longer willing to extend credit. In response to concerns about the adequacy of market liquidity, central banks have intervened in markets to provide additional short-term funds. The European Central Bank (ECB) and the U.S. Federal Reserve have been particularly active in providing short-term funds.

Markets have also exhibited increased volatility as credit and liquidity conditions have changed and risks repriced. A widely used index of market volatility, known as the Vix, is approximately three times higher than it was at the beginning of the year. As was the case with credit spreads, however, market volatility at the start of the year was extremely low by historical standards and the elevated volatility recently experienced has been seen before. In addition, investors should bear in mind that volatility typically exhibits negative asymmetry. In other words, volatility is typically higher in down markets than in up markets.

An old story in the world of finance is for market participants stung by losses to claim that a particular sequence of unfortunate events was so rare as to defy the laws of probability. What is in fact unfortunate for these market

participants and their investors is their — perhaps willful — ignorance of the laws of probability. For example, an oft-heard refrain as large losses are announced is that the debacle was caused by a “25-standard deviation event.” If market returns were normally distributed (i.e. a bell curve distribution) then the odds are that a 25-standard deviation event would never occur over one's lifetime. Alas for the spinmeisters of finance, market returns are not normally distributed. Market returns are characterized by a property known as kurtosis or “fat tails,” which means that extreme events occur with greater frequency than a normal distribution would suggest. Fortunately, probability theory addresses the issue of what people think are very unlikely extreme events. Known as Chebyshev's inequality, this theory states that there are severe limits on the number of extreme events that will be more than a certain number of standard deviations from the mean of the sample. In fact, the exact number is 1 over the number of standard deviations squared ($1/n^2$), so in our 25 standard deviation case, there is a 1 in 625 probability ($1/25^2=1/625$). Given 250 trading days a year we find that we could expect an extreme event like this as often as once every 3 years. And lo and behold, a look at current market conditions reveals many data points which resemble market conditions of 3 years ago.

Market Monitor is prepared by TIAA-CREF Asset Management and represents the views of TIAA-CREF's Investment Strategy and Client Solutions Group. These views may change in response to changing economic and market conditions. Past performance is not indicative of future results. The material is for informational purposes only and should not be regarded as a recommendation or an offer to buy or sell any product or service to which this information may relate.

TIAA-CREF is a national financial services organization and the leading provider of retirement services in the academic, research, medical and cultural fields with over \$400 billion in combined assets under management (3/31/07). Further information can be found at www.tiaa-cref.org.

TIAA-CREF Asset Management is a division of Teachers Advisors, Inc., a registered investment advisor and wholly owned subsidiary of Teachers Insurance and Annuity Association (TIAA). TIAA-CREF® personnel in its investment management area provide investment advice and portfolio management services through the following entities: Teachers Advisors, Inc., TIAA-CREF Investment Management, LLC, and Teachers Insurance and Annuity Association® (TIAA®). TIAA-CREF Individual & Institutional Services, LLC, distributes securities, member NASD/SIPC. TIAA, TIAA-CREF, Teachers Insurance and Annuity Association, TIAA-CREF Asset Management and FINANCIAL SERVICES FOR THE GREATER GOOD are registered trademarks of Teachers Insurance and Annuity Association.

Brett Hammond, Leo Kamp and Douglas Fore are available to comment on economic data. If you wish to speak with them, please contact Chad Peterson, Media Relations, 212-916-4808 or email cpeterson@tiaa-cref.org.

C39453