

# **D** THE JOURNAL OF **DERIVATIVES**

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**G**reat herds of candidates are now vying for the chance to run for President. But I refuse to succumb to the urge to write about politics yet again in the Editor's Letter! Let's talk volatility. It is now the summer vacation season, at least in the northern hemisphere, and one has the impression that despite the sudden volatility in various markets around the world, somehow not much is really happening. Or, perhaps I should say that lots of things are happening but nothing is being settled. The markets don't seem to know which way to go. Prices shoot up one day, crash the next, but after a few exciting and exhausting days, end up in almost the same place. Over the last six months (February 10–August 10) the S&P 500 Index has traded within an incredibly narrow range of less than 4.6%. Using Parkinson's volatility estimator based on the observed high and low prices over a trading range, this corresponds to annualized volatility of only 3.9%. Breaking the period up into 125 daily returns, the estimator gives an annualized figure of 12.2%, much more reasonable although still quite low by historical standards. The message is clearly that prices have not been walking randomly, but rather, wandering back and forth with lots of reversals: a strong positive return one day is likely to be followed by a negative return the next, and vice versa.

I could mention other major sources of uncertainty, such as oil prices or the near-Grexit (Greek exit from the eurozone) in July, but the Chinese stock market has probably provided the most impressive fireworks during this period, with realized annual volatility of nearly 40% and GARCH model forecasts from the NYU Stern Volatility Institute's VLAB (<http://VLAB.stern.nyu.edu>) currently at about 50%. Since February, the Shanghai Stock Exchange index moved by more than 2% on 22 days and more than 5% seven times. This revealed that, unlike in the West, stock market volatility is viewed as a serious political issue for the Chinese government. With about 80% of shares held by individual investors and only 20% by institutions (the opposite of the case in the United States), the fall from 5166 on June 12 to under 3700 on July 3 produced huge losses for a large number of small traders, many of whom were also highly leveraged. Although 3700 was still well above 3141 recorded just a few months before that, on February 10, 2015, the

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government felt it was necessary to intervene in the market to reduce the chance of social unrest. However, the policy responses have been of the deer-in-the-headlights variety—panicky reactions that have little clear impact on the problem at hand. There has also been some bashing of the usual suspects: short sellers and derivatives traders, but with not much of either short selling or financial derivatives in China, the stock market is not likely to be pacified no matter how much they are bashed.

Beginning in April and in various ways thereafter, the government tried to encourage buying. For example, margin regulations were loosened, although one might wonder if this is the most effective way to deal with overleveraged investors who are desperate to reduce their exposure to the stock market. Major financial institutions were encouraged to buy stock, as well—and in the Chinese system, government encouragement is, well, pretty encouraging. The government even began purchasing stock directly to prop up the market. But none of this worked for long. One problem was that the index was well over 4000 when the buying programs began. At that level, many investors could get out of their problematical stock positions with what amounted to big profits relative to where prices had been until just a few months earlier. Not surprisingly, great numbers of them took that opportunity, which overwhelmed the buying programs. By July, trading in more than half of the market names—over 1,400 of the mostly smaller, more-speculative firms—had been suspended from trading.

Those of us with a little gray hair have seen this movie before, not so much the failed government attempts to prop up stock prices, but typically when a government has tried to maintain an exchange rate that was inconsistent with the country's economic condition. As George Soros can attest, the result has generally been that a lot of money is pumped into the market, speculators earn fat profits, and eventually, the government has to give up and let the FX market move to its equilibrium level. It remains to be seen how things will play out in China if the government continues trying to hold stock prices at unsustainable levels.

A last thought on this general theme: It can be argued that essentially the same scenario is going on today in Greece, but with a twist: Greece is committed to a cur-

rency whose exchange rate is too high for their economy, but instead of being able to devalue to a lower equilibrium level, they are attempting to move the equilibrium up to the current euro rate entirely through changes in the real economy. They can't reduce all Greek prices relative to the rest of the world simultaneously by simply devaluing their currency, so instead they must rely on slack demand to drive down goods prices and wages on an individual basis. Some doubt that this extremely painful process will be any more successful in the long run than other countries' earlier attempts to hold onto an exchange rate that was too high.

Turning our attention to this issue of *The Journal of Derivatives*, which begins our 23rd year, we begin with an interesting article that bridges the gap between option pricing models that posit parametric stochastic specifications for both the returns process and volatility and the "local volatility" model. The former guarantees internal consistency within the model, with no profitable arbitrage opportunities at current prices or under any possible future constellation of prices, but it doesn't fit today's option prices in the market; the latter fits current market prices perfectly but has no underlying model for the dynamic evolution of volatility over time. Mazzoni synthesizes the two approaches by developing a local volatility model in which the dynamics of the underlying stock price follow a GARCH process calibrated to the current implied volatility surface. This means the model also encompasses "Practitioners' Black-Scholes" (PBS), which constructs the volatility surface from the Black-Scholes pricing equation with a different volatility input for each option. The new model performs well in empirical tests against the SABR and SIV alternatives.

Next is a new look at a kind of puzzling empirical observation about credit spreads in the bond market. Previous research has shown that spreads appear to narrow when the general level of yields goes up, a possible explanation being that high rates reduce credit risk by lowering the real value of corporate debt. Neal, Rolph, Dupoyet, and Jiang point out that riskless and risky yields should be expected to be cointegrated series. When they take that fact into account, the apparent narrowing of credit spreads disappears.

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Our third article actually grew out of a JOD article of my own, in which I took a critical look at Practitioners Black–Scholes and at the analysis that confirms the model’s validity by pointing to the high R-squared statistics that routinely emerge in goodness-of-fit tests. Because PBS is inconsistent with the theory from which the BS model is derived, my question was whether the BS *equation* used in this way was actually any better than some other random equation with no theory behind it beyond satisfying the static no-arbitrage conditions Merton provided in 1973. The answer was that my non-model model worked just fine, with R-squared values over 0.99. The simple equation from that article was later extended to produce even better fits, and in the present article, Orosi goes further to create extensions that cover the whole volatility surface and can even allow for nonzero bankruptcy risk.

The remaining three articles are each concerned with some new and/or exotic derivatives concept. In the first of these, Luo and Shevchenko look at target accumulation redemption notes (or TARNs). These are like interest rate cap contracts that make periodic contingent payments based on the difference between a market interest rate and a fixed strike

rate, with the wrinkle that the total payout under the contract is capped, so that the contract expires as soon as the maximum is reached. This payout pattern is obviously path dependent, so the standard valuation method is Monte Carlo simulation. In this article, however, the authors develop a lattice technique that is substantially more efficient. Next, Kim, Ryu, and Seo use a different market innovation, the Corporate Vulnerability Index (CVI), to study credit contagion running from the U.S. stock market to three different equity-related Korean markets. They find that contagion exists and appears to operate both through trading, mainly by non-Korean investors, and also in response to the information in the release of the CVI itself. Finally, van Bragt, Francke, Singor, and Pelsser address the difficult problem of creating an index of residential real estate values that reflects both market and idiosyncratic forces. Their new index is found to be a good representation of price behavior in the Dutch housing market.

OK. Back to my hammock. Have a great rest of the summer.

**Stephen Figlewski**  
**Editor**