

Nothing Could Be Finer Than To Be A Data Miner

Ah, the Bard! Never mind you do not know what a bard is or what, if anything, a bard does to make the world a better place and make a few bucks in the process. You know you are supposed to hold The Bard – Shakespeare, the original Slick Willy – in reverence for lines such as this from *Macbeth*:

“It is a tale told by an idiot, full of sound and fury, signifying nothing.”

This brings us to our present topic, whether very large changes in price signify anything for the longer term. Many of us believe when a market rises or falls by a huge amount it signifies a change in trading regime, and for good reason. Large moves occur when the underlying economic value of a market has shifted significantly, sometimes in conjunction with a news event but more than often not; the price then has to move dramatically to catch up to value.

However, what if these massive one-day events are nothing more than Shakespearian sound and fury? Let’s take a look across a small sample of markets with a very straightforward test. First, we will take a large data sample, multiple decades’ worth, and select those daily percentage changes (returns) that lie outside of a 97.5% confidence interval. If the returns for that market are distributed more or less lognormally, we will be selecting the largest 1.25% each of positive and negative price changes.

Next, we will look at the market’s price change 21 days, or one trading month, ahead. This will be done for both the largest positive and the largest negative daily returns. Finally, we will test whether the trading results observed in the two groups are different from each other or not.

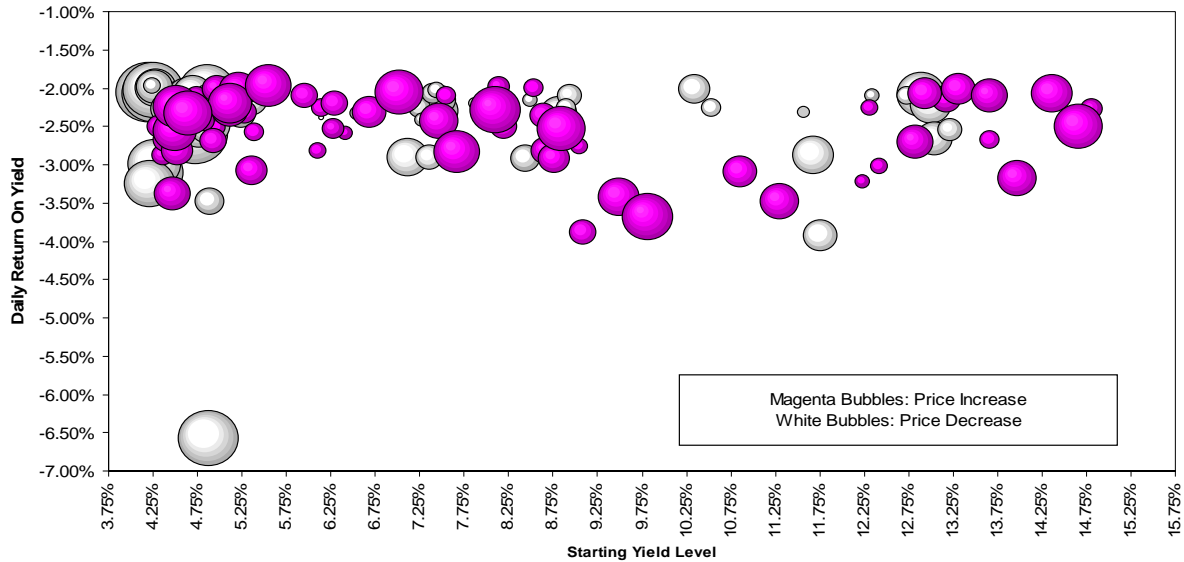
The prior expectation most of us might have for such a test is the large daily changes are more than just sound and fury signifying nothing. But those are simply opinions and on Wall Street, statistical analysis talks and opinion walks. And with the very long data histories available on the CRB-Infotech CD-ROM, we can go back to the early 1970s on a daily basis.

Treasury Bonds

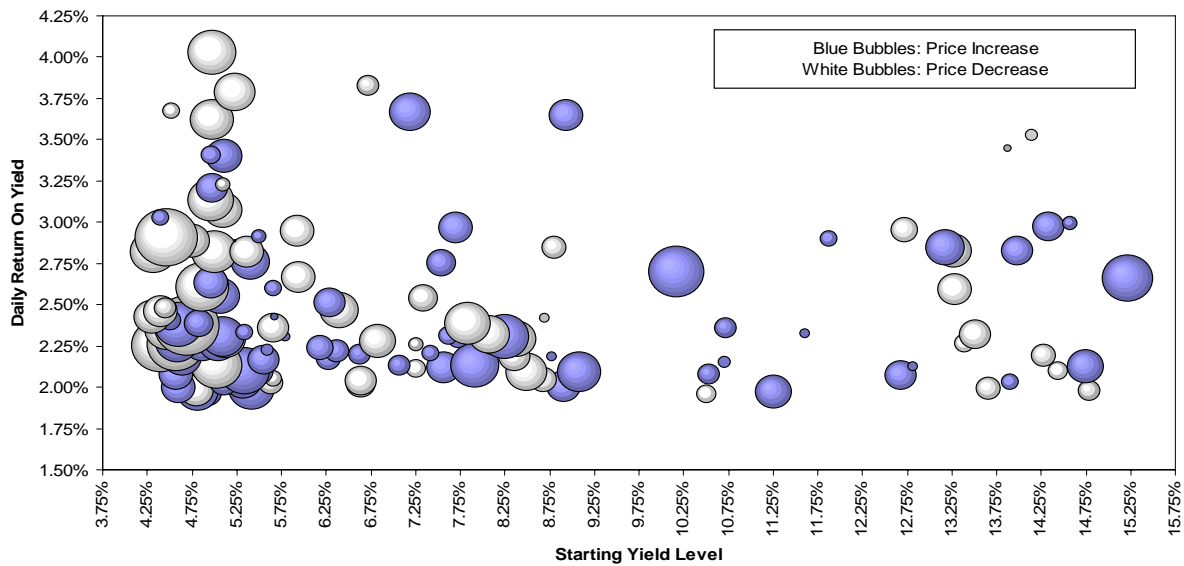
The first market we will examine is that for 30-year Treasury bonds going back to December 1980. These, and not the ten-year Treasury note, had been the benchmark long bond prior to the late 1990s. Some transformations were required here. The yield on the bond is the raw material for analysis, so we have to look at the very confusing “return on yield.” A large selloff in Treasury bonds is a large jump in their yield, and a large rally is a large decline in their yield. These yields then have to be converted back into price.

Two charts are presented below. The y-axis is the daily percentage change in yield, $\log(\text{yield}_{t0}/\text{yield}_{t-1})$, and the x-axis is the starting yield level. The positive forward price changes are depicted in colored bubbles, and the negative price changes in white bubbles. The size of the bubble corresponds to the size of the price change.

21-Day Ahead Price Change On 30-Year Bonds Following Large Drop In Yield



21-Day Ahead Price Change On 30-Year Bonds Following Large Rise In Yield



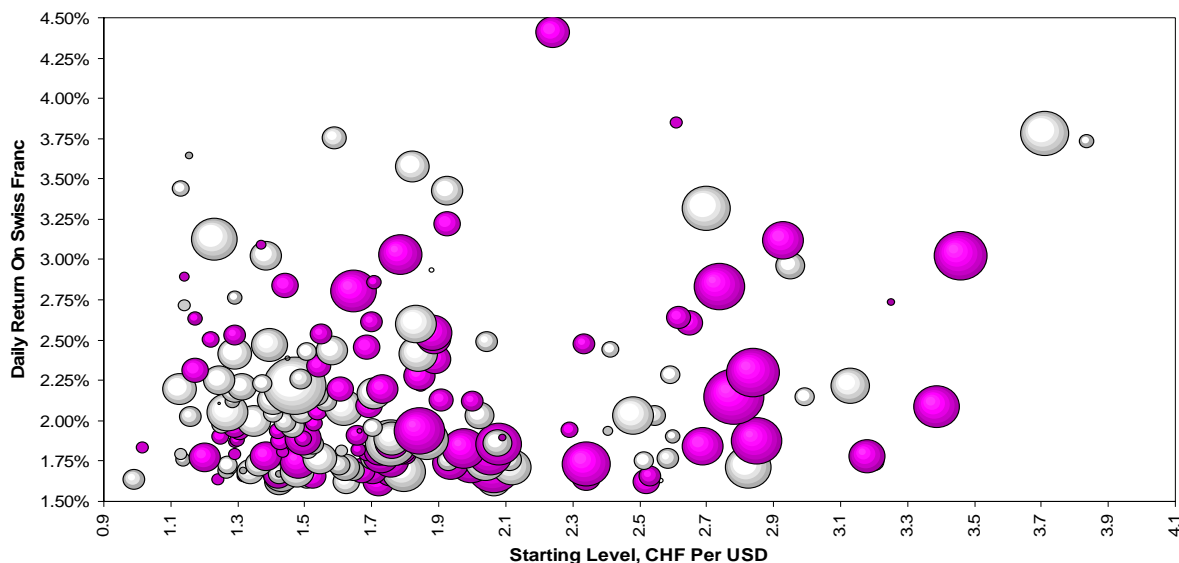
Now for the key question: Are the two sets of price changes different? There were 136 observations following large jumps in yield; the mean and standard deviation of the 21-day price changes were \$0.152 and \$3.903, respectively. The means and standard deviations for the 122 observations following large declines in yield were \$0.083 and \$3.210. Using a standard T-test to compare the two samples, they are equivalent at 69.4% confidence. In other words, come back a month after a large change in long bond prices, and you have close to a 70% chance of the price change being the same regardless of the price move's direction.

The Swiss Franc

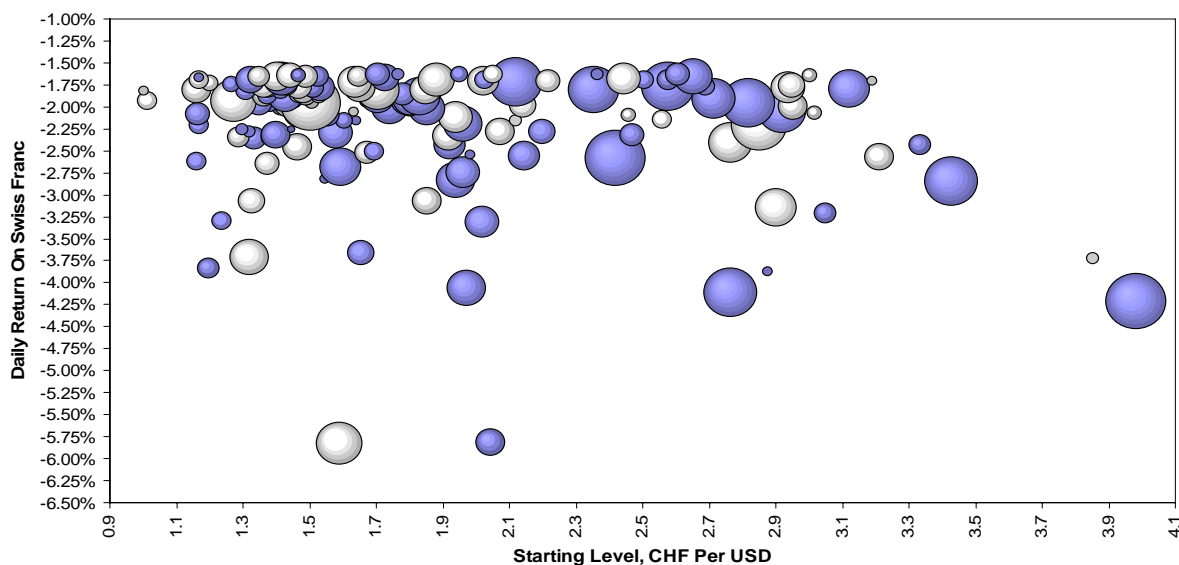
Now let's take a look at the cash Swiss franc going all the way back to January 1972. The spot rate is used instead of futures to sidestep the problem of contract rolls. The franc has been a famously trending market, especially in the days before the euro when the cross-rate matrix of various European currencies kept legions of traders occupied to their benefit; we will withhold judgment on whether society as a whole was better off for their efforts.

We should expect the franc to have stronger reactions to its big days. The charts below depict the forward price changes for the franc following large gains and losses in its exchange rate against the dollar.

21-Day Ahead Price Change On Swiss Franc Following Large Strengthening



21-Day Ahead Price Change On Swiss Franc Following Large Weakening

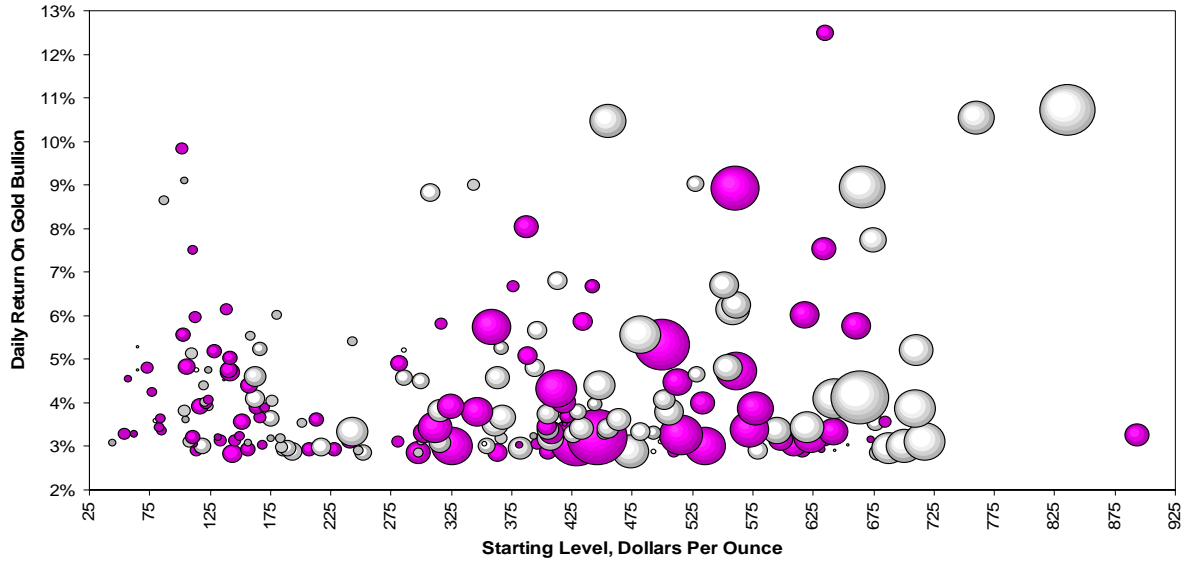


The two bubble sets look different; are they? The average forward price change in the 164 observations following a sharp weakening in the franc was 0.01408 with a standard deviation of 0.0764. Comparable figures for the 201 observations following a sharp strengthening in the franc were a mean of 0.007631 and a standard deviation of 0.074818. The two sets of data have only a 41.8% chance of being equivalent; this is consistent with a currency trader's intuition.

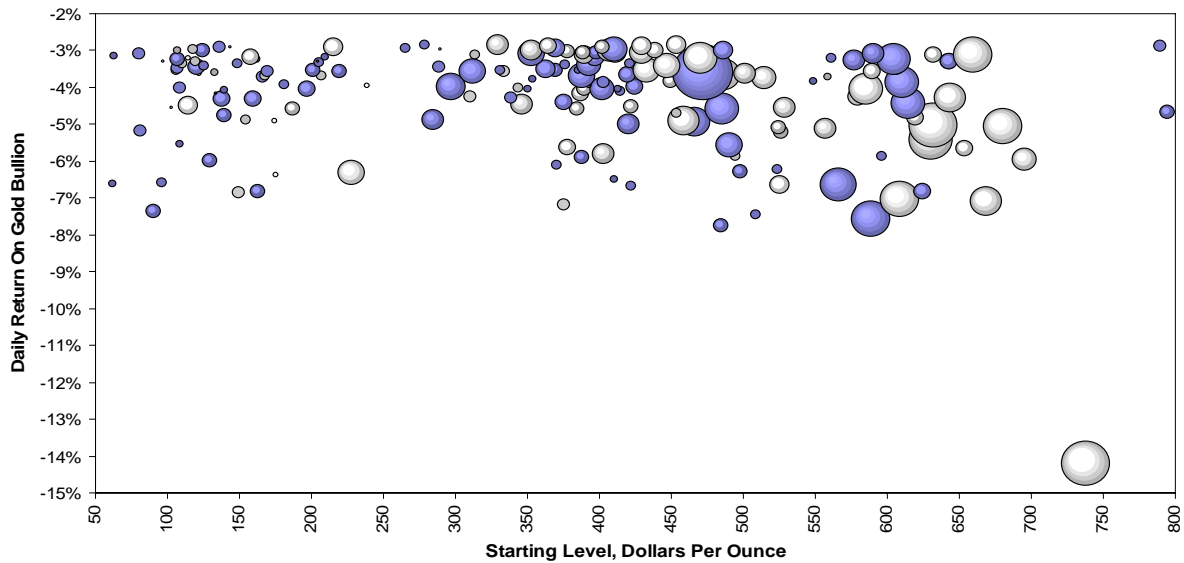
Gold

The final market to be examined is gold bullion, beginning in December 1968. Once again, the cash market is used to sidestep both the problem of contract rolls and in gold's case, what had been onerous price limits for much of its history. We should expect gold to lie further away from Treasury bonds, which have little short-term memory of their own large price movements and closer to the Swiss franc, which does appear to be set in its short-term direction by large movements as gold has tended to be an event-driven market. Is this the case?

21-Day Ahead Price Change On Gold Following Large Price Rise



21-Day Ahead Price Change On Gold Following Large Price Decline



The average forward price change in the 186 observations following a sharp weakening in gold was \$0.857 with a standard deviation of \$34.06. Comparable figures for the 209 observations following a sharp strengthening in gold were a mean of \$2.03 and a standard deviation of \$44.03. The two sets of data have a 76.6% probability of being equivalent; this is exactly what we should expect.

Implications For Technicians

A key takeaway from the three-market comparison is different markets do in fact have different characteristics. Doctrinaire technicians might rebel at this; they tend to see every market as “just numbers” and assume you can pool the cross-sectional data and subject each market to identical rules and identical trading systems.

This is a small study both in terms of the number of markets involved and the number of trading parameters – one, really – involved, and yet it indicates a more fruitful approach for technicians and indeed for all quantitative analysts would be to treat different markets differently.

This is hardly a radical approach given the obvious and known differences between markets. Bonds are asymmetric in their pricing behavior by virtue of their convexity and their bounded nature; interest rates can only go to zero. Currencies reflect intersecting yield curves, and these curves have unstable covariance. Gold exhibits optionality; it rises in price in spiky fashion and has long, slow declines. We could go on, but the lesson is simple: In trading, one size does not fit all and there are no magic-bullet trading systems for all markets.