Prediction and Three Necessary and Overlooked Ingredients for a Stock Market Recovery

By Christophe Faugere
Associate Professor and Chair of Finance UAlbany School of Business

I have been running my S&P 500 RYT valuation model (see paper) since May 1st 2009, and on a daily basis since June 1st, with about a 2-2.5% deviation from actual index value on average. The question in my mind is where is the index going to be in a year from now (target date July 2010)? There are some obvious ingredients for a market recovery that every educated investor knows about: higher corporate earnings and higher earnings growth. I want to discuss a couple of other factors that are overlooked in the current state of understanding in Finance. First of all, marginal tax rates on dividend and interest income, as well as on capital gains do appear in some calculations, but the press and the blogosphere do not seem too worried about these.

Much less obvious are three factors I pay close attention to *as affecting the stock market*: 1) Inflation expectations, especially the Fed's target; 2) the inflation risk premium due to uncertainties about the path of future inflation and 3) the yield on 30-year Treasuries. The last two ingredients have actually played the biggest role in my valuation formula in terms of my RYT estimates tracking the daily ups and downs of the index. Before I get into the specifics of what these inputs should be and how they matter, let me zoom out and put down some ideas about what the larger quest is about here…. If I may…

First stop: the dreaded minefield of prediction. One point I'd like to make is that market prediction is not as hopeless as many academics and naysayers may think. In fact, the reason that prediction in Finance *appears* impossible is twofold. First of all, Finance does not have a complete understanding of the mechanisms that underlie how the stock market is priced…. answering that the mechanism is "the law of supply and demand" doesn't count, as even if it is true, it explains zilch. Secondly, the previous issue is confounded with the presence of another layer of complexity that is the occurrence of random shocks to the system. Unfortunately, shocks to the system appear unpredictable and their consequences are often ambiguous.

One way to think about random shocks is as *omitted* relevant variables in a universal model of reality. Randomness is a catchall category for things we can't account for and do not yet understand, or even believe that we can't model mathematically to a great degree of accuracy… take your pick. Think about a physical system of two frictionless large scale objects coming at each other on a two-dimensional plane with established speeds and masses. Newtonian physics can *predict* the future trajectory of these objects after they hit one another. Usually, the prediction is very close to the actual outcome.

If you could decompose all the physical forces going into a coin toss, you could predict which side the coin would land on. The ideal world of 50/50 chances is just that: an ideal world that does not take side with respect to underlying forces or mechanisms, because it assumes no such forces are applied. Statistical distributions are a way to make sense of outcomes we observe but for which the generating processes are not understood. It is like taking a photograph of a landscape and describing the distribution of pixels and saying that the distribution of pixels has certain properties that capture reality, whereas the landscape is a 3D composition that grew out of the natural process of life and

competition between species for habitats, for which the laws of existence and development are knowable.

Quantum mechanics is bit more tortuous. Randomness certainly appears to play a role, as for example in the Heisenberg Uncertainty Principle. Observation affects the outcome of the experiment (motion of particles) and there is no way to know beforehand what the outcome will be without interacting with the experiment by observing it. I like the irony of the name "Uncertainty" principle, which captures the essence of my definition of randomness. Einstein himself was dissatisfied with the reliance upon probabilities in quantum mechanics. But even more fundamentally, he believed that nature exists independently of the observer, and the motions of particles are precisely determined. In his view, it is the job of the physicist to uncover the laws of nature that govern these motions, which, in the end, will *not* require statistical theories. Thus prediction is not hard once you understand the *complete* model of reality. Of course, I am not trying to make any claims of omniscience… That's for the "Godhead" to know.

It is interesting that even in the field of behavioral finance, which emerged from a rejection of the standard "rational" economic model; market behavior is talked about as if it were unknowable. The culprit being the famous "irrational" and therefore *erratic* injection of psychological twists and biases in economic behavior…. See how it is almost like we are talking about randomness again. An interesting schizophrenic aspect of behavioral finance is that scientists there are still trying to detect *patterns* in these behaviors, i.e. understandable and repeatable logical sequences going from premise to predictable consequences, which they believe they can decipher, maybe only for a brief time when these effects are present.

Forecasting the Forecasters

People who try to chart the course of future stock prices are navigating dangerous and treacherous waters. What needs to be done? We understand that today's prices factor in *today's expectations* about the future. To keep things simple assume that the only three things we have to worry about are next year's earnings, today's discount rate (the interest rate used to find the present value of these future earnings) and the growth rate of earnings. Is the discount rate fully determined by current conditions? Not quite. In fact, as Irving Fisher argued more than a century ago, the interest rate should factor in the investors expectations of inflation. In the mid 1970's Marty Feldstein and Michael Darby showed that marginal tax rates matter, as investors want to insure a fair return after tax as well. In the end, we need to know investors' *expectations of earnings, growth, tax rates and inflation*.

To predict ahead we have to find out about the process by which expectations are formed and predict the conditions that will be prevalent at that time in the future when these expectations will be made…. In other words, we need to *forecast the forecasters*! In economics we believe that expectations at the time they are made must include all the information relevant to the decider. We call those "rational" expectations. Investors learn from the past and do not get fooled again if they become aware that they forgot a key piece of information the second time around.

Maybe it is not as hard as it seems. Let's see. Imagine that earnings next year are actually going to be at 90 for the S&P 500, but that the current forecast is at 80. First

interesting discovery is that today's price does *not* depend on how wrong the expectation is from actual. In fact, the *actual* earnings next year could be 85 and this would still not affect the price today… Does it mean that it doesn't matter how *wrong* forecasters are? On the face of it, how could we accept that? What we mean by not being "wrong" is that investors must get a sense that these expectations are rational; i.e. that they are the best forecasts using all information available. A forecast has to be *believable*! So being wrong is not about missing the target, it is not even about by how much you missed the target, it is about whether you gave a good honest effort that makes sense to people. Of course it helps if the forecast ends-up close to the actual ex-post. But let's get back to that point a bit later…

Secondly, assume that you want to forecast what the market price will be in three months. Do you need to know *exactly* what the economic conditions will be in three months? Not necessarily. For example, assume that the Fed pursues a credible policy of maintaining an inflation target of 2%. While there may be temporary deviations, with every new forecasting horizon you would reset the clock at 2% for the next 12 months. The stability of monetary policy generates the power to forecast inflation *accurately*. Dealing with taxes is the same thing. The stability of the tax code also enables tight forecasting. The growth of earnings can be a little bit trickier, because it depends on the two forecasts at the ends of the forecasting period. If the base is lower than you thought, the growth rate will be higher than anticipated starting 3 months from now. Can you know anything about that? Well, there might be something to rely on that makes the growth rate forecast reasonable.

In fact, the only way to gauge that a forecast is reasonable is when it is based on the idea of *mean reversion*. Getting a sense of return to normal conditions, from a set of either normal business or abnormal business conditions has a comforting aspect to the human mind, and also tends to happen to economic variables such as detrended earnings or earnings growth. Forecasts that are all over the place do not establish a good use of this property and do not instill confidence. This is probably the reason why forecasters use models that have central statistical tendencies, and why "good" forecasters make forecasts that are on average closer to actuals, because actuals hug a trend.

Required Yield Theory (RYT) and the Two Key Ingredients for a Recovery

In the article that sets the foundation for RYT, we did test the model back to the 1950s on a quarterly basis looking at the valuation of the S&P 500, and did very well. Recently, in June 2009, I started looking at daily valuation. It has been surprising to me how volatile the predictions have been and how much in synch they are with the actual figures. This is mostly due to three inputs. The first is expected bottom-up S&P operating earnings, which I adjust on a daily basis by interpolating 12 months forecasts located between now and next month. The second input is the inflation risk premium and the last one is the 30-year Treasury yield. Changes in operating earnings are very small; a few cents every day. Not enough to produce the volatility we observe.

On the other hand, inputting the daily 30-year Treasury yield gets us the desired volatility and directionality. The inflation risk premium I initially assumed was around 0.20% (I consider it is for a 10-year Treasury). I have updated on a bi-weekly basis and the range has been 0.2%-03%. This is an aspect of the model that needs to be improved

upon as I am using a two-weeks moving average of implied risk premia (implied by making the RYT formula equal to actual) for my next two weeks worth of estimates. Ideally, I would like to come-up with independent measures. My implied values are very stable however, and they are economically sensible. A 0.2% value as an inflation risk premium is $1/10^{th}$ of the expected inflation target, which makes sense as the inflation risk premium should probably be a small fraction of the actual expectations. I have reviewed multiple works by Fed economists in that matter and they seem to me all over the place and not really consistent with my observations.

Last but not least, let's talk about the role of the 30-year Treasury yield. In our RYT article, we show that the 30-year Treasury is related to a measure I call the Fear Premium. When there is flight to safety, investors bid up the price of the 30-year Treasury, and its yield falls. When the 30-year T-yield falls below what we call the *required yield*; i.e. the yield that makes investors whole after-tax and inflation; we measure that gap as the Fear Premium. Investors are willing sacrifice the minimum real after-tax return they should be getting (around 2.21%) due to fear. On the other hand, the yield on the stock market will rise by a symmetric amount, because investors are fleeing from stocks to safe bonds. This will depress prices. Hence the *30-year T-yield* and *S&P 500 prices* are moving in the same direction in times of fear.

With the Fed now involved in buying back the 30-year Treasury, this artificially depresses the yields on the 30-year. While this phenomenon is *not* due to fear, investors who are trying to hedge to preserve an expected return are not able to do so, and if they stay with stocks they will require a higher yield there to compensate them. In other words, my conclusion is that if the Fed tries to keep long-term yields low, it will *depress* the S&P 500 index.

All in all, it is critical that fear subsides in our economy as it is the precursor of movements in the 30-year Treasury which work to depress the stock market by the mechanism demonstrated above. The Fed's actions will have only a temporary depressing effect on market values, as the buying program is limited in scope and time. Eventually the yield on the 30-year Treasury must bounce back, which will help the stock market as it will be a sign of liberated pent-up confidence and also will help large scale lenders such as mutual funds and pension funds. Below are my expectations for next year (July 2010):

1. Expected S&P 500 operating earnings for 2011 have to be back above $74 range.
2. Expected BV per share growth for 2011 above the 5.3% range.
3. 30-year Treasury yield must be above 4.5%.
4. Long-run inflation expectations have to remain anchored at 2%.
5. Inflation risk premium below 0.4%
6. Marginal taxes rates remain the same.
7. In that case, the S&P 500 index should end-up above 1045 in a year, as per RYT calculation.

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