

The Nature of what is Knowable about Financial Markets and the Conditions for Profitable Trades

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Imagine you wake-up tomorrow, turn on the TV to the money channel and hear the following news: “A group of researchers is scheduled for a press conference at the AAA-think-tank later this morning. An announcement is expected that the mystery of how financial securities are priced has finally been cracked. They claim they have found a way to accurately *predict* daily prices for stocks and other financial assets such as government bonds.” What would your reaction be? Indifference? Disbelief? A tinge of curiosity or perhaps excitement? In all likelihood, you may welcome this piece of news with a healthy dose of skepticism.

Let us for a minute suspend disbelief and assume that this claim is indeed *true*. The first question one may ask is: what is that mechanism behind the determination of securities’ prices? But, as the architect of the Matrix in the second movie installment of the series says when addressing Neo: “Your first question while pertinent is not necessarily the most relevant one.” There are more pressing questions:

- What do they mean by *predicting* asset prices?
- Have they found a basis for telling the *true* worth of financial assets?

First of all, these people can’t be serious in claiming to foretell stock market prices. Most of us understand and accept that the future is unknowable. The best that anyone can do is to make a market forecast given all the information and *expectations* available at the time. Near term forecasts are more reliable than farsighted ones. Hence, while these researchers may have solved the riddle of how stocks and Treasuries are priced, it is a different and much harder ballgame to *predict* future stock prices. Taking an extreme example: who outside conspiracy theorists could have foretold the tragedy of 9/11 and its human and economic toll, even hours prior to the event?

Without knowing how our group of researchers solved this riddle, we should first understand a very important basic fact about how financial assets are priced. Since assets are claims against future cash flows, their prices must be based on forecasts of these cash flows and surrounding financial and economic circumstances, or what we economists call *expectations*. More importantly, it is often overlooked that while expectations are a primordial input, they do *not* have to be *correct* in the sense that they will be actually realized. Of course expectations cannot deviate from reality too much or for too long.... More on that in another article....

Markets continuously react to new information. Future information is by definition not yet available to forecasters at the time of their forecast. The TV commentator and our team of researchers used the word “predict” a bit cavalierly. Rather it is likely that what they mean is that they have achieved a eureka-type of understanding of the process by which these financial assets are priced, one of these fundamental insights that sometimes brings all of us to exclaim “I got it!” Predicting is not the same as understanding and explaining.

Explaining is an important and necessary step but predicting may be even more important, because that is what allows human beings to take action. Prediction allows us to make sense of the likely consequences certain actions will have. Thus we avoid some actions and embrace others. Physics can explain the motion of large celestial bodies in simple two or three bodies systems. However, the whole venture would be quite worthless if Physics could not then *predict* planetary and rocket trajectories when we send astronauts to the moon. In Finance, the difficulty of prediction is compounded over two layers of information: 1) the forecasts of actual economic data and 2) how investors' (subjective) expectations are set in response to these forecasts.

Back to our team and their discovery. How do they know their theory is correct? In a sense, their theory has to make an assessment regarding stock market prices and match reality. It is the comparison of their assessment of the stock price versus what it actually is, which will confirm or infirm their theory. Many researchers back test their theories. Looking in the past, our economists must be able to match the prices very accurately, given that in hindsight it is easy to piece together all the information about the correct set of *expectations* relevant at the time, some of which may have escaped us even then.

For the purpose of simplicity, let us imagine that our researchers incorporate all the relevant information and have come-up with a formula to price the market in *real time*. Their formula matches the actual stock market price tick by tick. For example, the stock market index is at 1,500 on November 2nd at 1:30 pm and our group of economists simultaneously issues a statement: "Yes, our calculations confirm that the index is *worth* exactly 1,500". Anytime the index moves, the same statement is re-issued by our economists.

What a wonderful but boring world this would be! It is a bit like the movie "Stepford Wives", in which "imperfect" human beings perceived as disagreeable by their spouses are replaced by plastic-perfect and predictable robots. There would be no chances to be taken, no possibility to make a profit by buying at a *lower* price than what it is worth. Having found the key to valuing these securities could in fact be very disappointing for many of us. On the other hand, this outcome may be fine for many investors, since they are getting exactly what they pay for. There is no win-lose situation here. A trader is still able to realize a positive return. For example, buying a fair priced Treasury at a quoted yield of 5%, would earn you a \$50 coupon year after year. However, there does not seem to be any room for making huge profits, or is there?

Some traders may still book great profits because of the flow of *new* information and the game of predicting future price movements. For example, "bad" news about the subprime mortgage market, and the losses incurred by financial companies may temporarily depress the value of the whole stock market. Investors may infer that when the environment gets better and toxic assets have been cleaned-up, the index will get back to its "normal" range because the profitability of these firms will then revert back to normal given the other areas they operate in (consumer loans, corporate loans, insurance etc...), and thus prices may eventually rise *faster* than if the information had been neutral in the first place. In fact, some investors having cash on hand may see this as a great buying opportunity.

Assume that the assessment of the future path of recovery of the index is shared by the *demand* side of the market. The decision to buy the index at that time reflects the view of how the index's price is likely to rise in the future. On the other hand, the seller (supply-side) must either be facing an immediate need for cash, i.e. they need to sell exactly at this time to get cash, or they must share a more somber view of the future price path. In their mind the index is likely to drop further. At any rate, they feel the recovery is uncertain and don't want to hold the stock.

It is then interesting to note at this point that a complete and exact understanding of how securities are priced does not *remove* or prevent profit opportunities. Profit opportunities are in part the result of disagreements amongst traders about the future. In a way, this is a version of what economists call the "efficient market hypothesis" that stock prices are unpredictable. The reason is that future events which may affect stock prices are unpredictable. However, if stock prices are *explainable* they must contain a non-random or stable component. In fact, we have suggested in our example that the mean-reversion of corporate profitability to a normal range may provide the ground to establish that stable component.

I compare Finance to driving an automobile at night on a narrow country road in France. You know you will eventually get to your final destination and you know the principles of driving a car, but you don't know that there is a sharp turn coming up in 10 miles. You can only react to the new set of information as your headlights reveal the road ahead. New information is critical and can also affect the outcome quite a bit if you fall in the ravine when missing your turn. You are also affected by yours and other drivers' expectations of road conduct and risk taking. Physics by contrast is like riding a train (in France). You have a precise idea of how long the trip will be, there is no question that you will arrive at your exact destination and so you can close your eyes and relax because the train does not need any extraneous information along the way, as it is positioned on a fixed track and its speed is predetermined and there is only a remote probability for unexpected changes in the surrounding environment.

Notwithstanding, our imagined new financial theory is still an exaggeration and no theory in the realm of social sciences can claim to achieve that level of reality matching. In other words, while they are fully confident about their insight our team of economists is facing a bit of a conundrum. Assume the stock market index is at 1,300, and their theory finds that it should be trading at 1,275. To keep it simple, assume that over the last month the index has stayed at that same level of 1,300, and our team derived the same result that the index is worth 1,275. Are the economists correct, leading to a trading opportunity, or are they wrong? If the economists are right, then the stock market is currently overpriced and investors should short (sell) the index.

If the discrepancy is due to a *systematic* error in the theory, then this puts the theory in jeopardy. On the other hand, if it is true that the values that the economists keep predicting over time and on average are closer to actual prices than any other theory, this must be a good sign that the theory is *superior* to existing ones. What explains the difference between actual and theory-induced values then? Economists call it residual noise, i.e. unaccounted and unpredictable factors. Indeed, the best our economists can aspire to is to have figured out a reliable *mechanism*.

Because mechanical engineers understand how power generating turbines work does not necessarily mean they can always account for the behavior and performance of a given gas turbine. Obtaining all the environmental conditions to make that determination would be too costly. They can however explain performance within a tight and satisfactory range. This is, I believe, the best that can be expected from us in Finance.