Render Unto Caesar

There are two major strands to the Epsilon Theory project. The first tries to look at current events through the lens of game theory and what is commonly referred to as behavioral economics. I've written a lot about QE in this regard, because it's the biggest driver of game-playing in markets today. By far. But I'm also looking at other policies and their intended (and unintended) impact on market behaviors, from regulation and enforcement of insider trading to European public sector deleveraging to Abenomics. The common denominator to these notes is a focus on the important yet largely hidden role of Narrative and its offspring -- Common Knowledge -- in determining market behaviors, as well as how malleable both are in response to the efforts and interests of powerful social institutions.

The second tries to look at market behavior through the lens of information theory. Here I'm not looking for what's malleable, but what's constant. I'm looking for the formal ***structure*** that underpins human markets across geographies and across centuries, from the Pharisees of 4 AD to the Americans of 2013. The common denominator to these notes is a representation of security prices as a set of decision equilibria on an informational surface, where we collectively and subjectively react to new signals in predictable ways. There may be a lot of game-playing that takes place in markets, but these games have identifiable rules and measurable signals. Maybe not the rules and signals that a self-consciously "scientific" explanation of markets would have you believe, but rules and signals nonetheless.

I make an intentional effort to include both strands in most of the weekly notes, because the formal structure provides a rigor to my analysis of current events, and the current events provide a vitality to my presentation of formal structure. Or that's the hope, in any event. Today, though, I want to provide a brief stand-alone example of each strand. When I first came across these vignettes, I got goosebumps. I'm not expecting that sort of physiological reaction in you, but I do hope it inspires a glimmer of excitement and keeps you coming back for more.

The Malleable

The Redding Library had its annual book sale a few weeks ago, and I brought home my usual car load. One of these books was an 1846 English language translation of *A History of Inventions, Discoveries, and Origins*, originally written by John Beckmann, a professor at the University of Gottingen in 1817. The English publishers saw fit to give James Watt and the Steam Engine pride of place as the first entry in the translated book, with an entirely new inserted chapter, but the original version by Prof. Beckmann had another topic that he thought deserved top billing in a history of inventions and discoveries – Lending and Pawnbroking. Consider that for a second … credit and lending as an *invention*, as a *discovery*. It's not just the ubiquity of credit and lending today that makes this treatment by Beckmann seem so alien. I mean, the transportation and power generation ramifications of the steam engine are at least as common as lending today, but we have no problem thinking of something like the steam engine as an invention. No, **it's the notion of a *social invention*, as opposed to a *technological invention*, that we have such a hard time wrapping our heads around.**

But here's the thing … social inventions occur all the time. Just because they are absorbed by us in ways that external tools or technologies cannot be absorbed does not mean they are any less novel or any

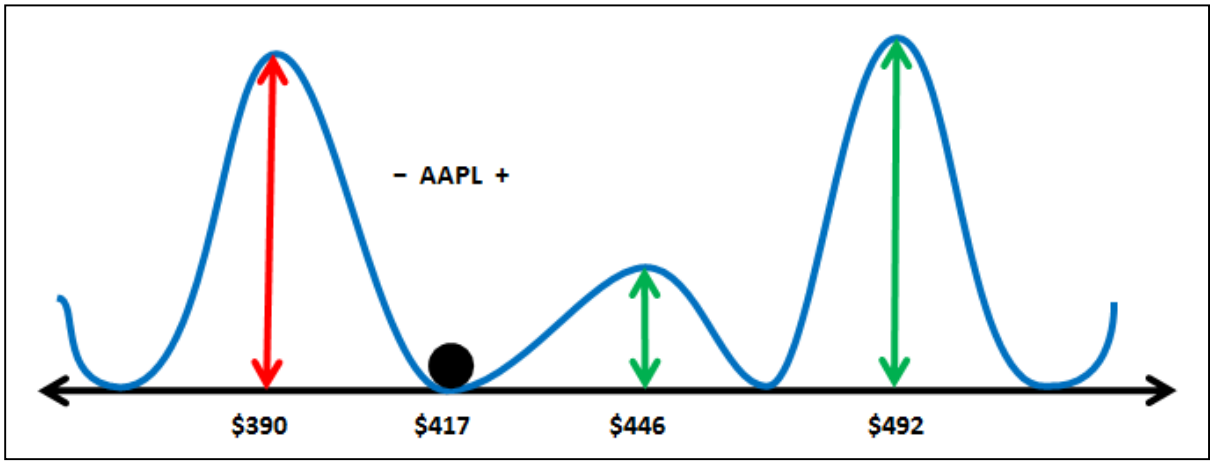
less invented or any less impactful. On the contrary, they are typically ***more*** of all of those things. The Prussians invented public schools in 1809. Do we think of this social institution as a modern invention specifically designed to create mass fealty to the State in exactly the same way that Henry Ford's assembly line was specifically designed to create mass automobile production? Of course not. Why, everyone knows that public schools are our birthright and our blessing, that a free education is the hallmark of a civilized nation. Come on, sing it with me … "I believe that children are our future".

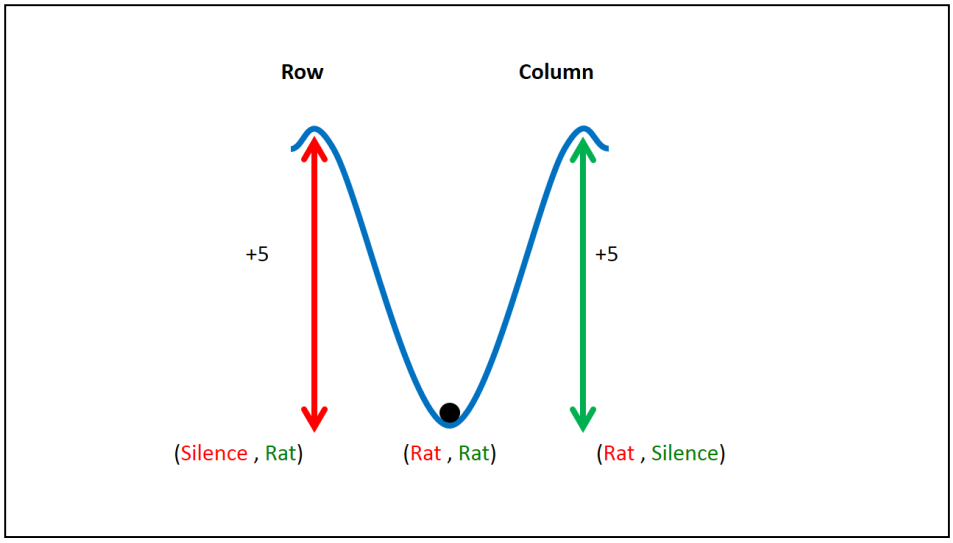
Do I think that free *and compulsory* public education is a good thing? Yes, I do. But that doesn't mean I can't also see it for what it IS – a social invention of the modern nation-state whose core purpose is the generation of loyal, useful subjects. And as that conception of loyalty and usefulness changes, so, too, will public education. In fact, that's the only thing that will change public education.

Do I think that modern portfolio theory and mass public ownership of stocks are good things? Yes, I do. But that doesn't mean I can't also see them for what they ARE – American social inventions of the 1950's whose core purpose is the generation of a loyal, useful source of investment capital and financial servicing fees. Today that loyalty is wavering and that usefulness is shifting. As a result, I have no doubt that we will see a new wave of social inventions and Narratives to re-engage investor loyalty and identify new areas of usefulness. By seeing things for what they are … by calling things by their proper names … I hope to be able to ride that wave, or at least avoid being swamped by it.

The Constant

Here's a hypothetical informational surface I constructed for Apple stock and published in a note this summer, based on support and resistance levels derived from standard technical analysis approaches. And below that is a stylized version of an informational surface for an equilibrium within the Prisoner's Dilemma game. In these models, the trough "walls" represent the amount of information that prevents the equilibrium "ball" from rolling to a higher or lower price point. New information in the form of a signal recognized by market participants pushes the ball in one direction or another, but only if that signal possesses enough informational strength to overcome an informational barrier will a new price equilibrium be reached.





Now here's a chemical equilibrium taken from a standard text on thermodynamics, and below that is a textbook representation of a stylized chemical equilibrium showing heat loss (on the left) and Brownian motion (on the right). Here the trough "walls" represent the amount of energy that prevents the equilibrium "ball" from rolling to a different chemical state. **From the most fundamental perspective, however – information and energy are the same thing.** The charts below are expressing exactly the same formal structure for chemical equilibria as the charts above present for market equilibria, where the common thread is a fundamental depiction of the world in terms of entropy.

This model of the chemical world is much more intuitive because we are accustomed to thinking of chemical reactions in terms of temperature, which relates directly to entropy/energy/information. We are also trained to think of chemical reactions as happening on an invisible molecular scale, where we need some sort of scientific chart or graph to "see" what is going on. None of this is true with our intuitive thoughts about the financial world, where we are accustomed to thinking in terms of price, which does not relate directly to entropy/energy/information, and where we are trained to think of transactions as happening on a human scale. **By getting past our intuitive sense of market structure as a mere representation of price over time … by recognizing that a market price equilibrium has the same underlying informational structure as *any* equilibrium found in the universe … we can apply *much* more powerful tools and extract *much* more useful information to support our understanding of market outcomes.** This is the true Alchemy of Finance.