

Financial Bubble Cycles: Feeling the Heat and Seeing the Light

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Addressing suspicions of contemporary economic science have led us to illuminating and depressing results. Suspicions arose when we understood that the Law of Supply and Demand on which Economics relies has nothing more to justify it scientifically than its resemblance to Newton's Third Law of Motion. This is the zero-sum, "Every action has an immediate, equal and opposite reaction" law. Surely some physical science since Newton must be relevant to economic science, we thought. It seemed further suspect to us that free market economists can proclaim their science with religious zeal, at the same time as it fails to predict unusual and catastrophic events. When we grasped that successful economic transactions cannot be zero-sum, we wondered how Newton's zero-sum laws of motion could apply at all.

We identified a fudge factor in what we have renamed "Newtonian Economics", to identify the scientific credentials of Free Market theory. The fudge factor is "normal profit". The law of supply and demand describes an ideal break-even economy, where no one makes any money. So, economists perforce include in their supply and demand calculations "normal profit" sufficient to interest anyone in owning a business.

Newton's laws apply best to frictionless, perpetual motion mechanisms like planets in orbit. Anything on earth (like a pendulum or gyroscope) that operates as a demonstration of Newton's laws runs down sooner or later because of friction. Normal profit appears in Newtonian economics just as friction appears in earthly versions of Newtonian motion. Mechanisms on earth need new energy from fuel to keep cycling, and economic mechanisms need new economic fuel, which is buyer demand.

It became evident to us that starting from the most micro-economic transactions, zero-sum calculations do not apply. Barter transactions are zero-sum; financial transactions require a profit. The only non-zero sum law in physical science is the 2nd Law of Thermodynamics, the law of increasing entropy. If profit must result from a transaction, then profit is increasing entropy – and increasing entropy is waste. Rather than profit being the fuel of future value creation, we find that value creation sequesters profit before it can do damage. Profits not sequestered by value, but that are instead multiplied by purely financial means create bubbles of galloping entropy, of toxic economic waste. As in the recent crisis, bursting bubbles push an economy toward thermo-financial equilibrium.

In Newton, action and reaction balance each other instantly and perfectly. In thermodynamics, cause precedes effect, and will make more mess than order. In Newtonian economic science, one studies correlations in snapshots of clouds of data. In thermo-economic science, one seeks the root causes of effects. Despite having no data about things that had never happened, oil authorities claimed to know what they were talking about. Studies of risk factors for oil spills had not sought possible worst case outcomes and their possible causes, but only made lists of likely failure mechanisms.

A cause is known by at least one effect. But, starting from an effect and working backwards can point toward multifarious possibilities that might require an expert panel or a federal jury to decide upon. Lacking either data or knowledge, but guided by a belief in a universe of order and equilibrium, executives pooh-poohed anxieties. Basic knowledge of the thermodynamics of cause and effect would bring a quite different approach to risk management.

Looking at the thermodynamic implications of economics has been both exciting and depressing for us. It is exciting that thinking in scientific Cause & Effect (thermodynamic) and Supply & Demand (Newtonian) terms, instead of just in "Free Market" ideology, unlocks clues to solving our bubble building and bursting cycles of devastation. It is depressing to real-

ize that the "Power Elite" in banking and finance may not believe that solving the bubble problem is in its interest. The richest and savviest players in the bubble game have tools not available to the rest of us that capture maximum advantage on both the up- and down-sides of a bubble. These players benefit from deep and frequent bubble cycles.

Arguments rage as to the wisdom of cutting government spending to curtail the growing deficit vs. increasing spending to put people to work, and thus generate the demand needed to recover. Both sides share an error. Both think of economics as a frictionless, fully efficient, game of business cycles with Newton's laws *in loco parentis*, using "unseen hands" to protect the marketplace ("Black Swan" disasters excepted.) It is immaterial to most, and advantageous to others to maintain the fiction that Newtonian economics can fully describe how our world works.

A thermodynamic approach makes it obvious that when a financial system is knocked far from Supply and Demand equilibrium, it likely collapses toward a different equilibrium ... toward the thermodynamic equilibrium called maximum entropy. In this paralyzed chaos, no energy is available to restore order. In the equilibrium state we approached in this most recent bubble burst, huge amounts of asset value and the fuel/potential to generate more value were lost. Overheating severely damaged the economic engine itself. As a result, no new economic work could be done and no one could say where all the money went.

There are two probable remedies:

- 1) Add new value to a system to rebuild and refuel the economic engine. This value has to come from future earnings. It is debt that can only be repaid by increased tax collection; or
- 2) Reduce spending in order further to transfer wealth from the poor and middle classes to the rich.

Viewing financial bubble games from a thermodynamic perspective reveals them as the quasi-Ponzi, blood-soaked sports that they are. But without full logical and scientific argument to counter chicanery and rebut the endless propaganda that promotes financial bubble behavior as virtuous, the bubble machine bubbles on.

Accepting Cause and Effect as reality, and planning for worst case outcomes, are adult approaches to life. Not all are eager finally to leave their childhood and embrace adult opportunities *and* responsibilities.