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"Capitalism without failure is like Christianity without hell."
-WARREN BUFFETT

Why economies fail. Does it ever frustrate you that our political leaders never seem to learn? It certainly exasperates me, yet it's also a fact that this is a global problem. Our elected representatives aren't the only knuckleheads out there, but at least ours are voted into office (often, for no apparent reason).

If there is anything the last 100 years should have taught us, it's that heavily state-controlled economies eventually reach the near-death-experience stage. And yet, politicians worldwide continue to embrace an increasingly "statist" approach, including in the US, where an ever-heavier regulatory burden and paralyzing complexity are piled onto our increasingly beleaguered private sector. Rather than implementing the necessary reforms, our leaders rely on the Fed to print money, manipulate interest rates, and levitate asset prices in order to offset the drags caused by misguided policies.

In his best-selling book, *The Rational Optimist*, anthropologist Matt Ridley goes back much more than a century to document how often in the past bad governments have brought down once-flourishing societies. The common denominator is a phenomenon that could simply be called "bureaucratic overreach." Governments seem to have an innate desire to control, but the most successful economies are those that are freest and where creative destruction constantly punishes bad ideas while rewarding good ones.

This month's guest *EVA* is another purloined piece from the prolific John Mauldin and his stable of exceptional contributors. In this case, it is none other than the famous George Gilder, one of America's true thought leaders, especially in the tech space.

Mr. Gilder's essay is both alarming in its scathing indictment of the encroachment of state power and yet encouraging in the potential that the field of Information theory holds out for humankind. As Matt Ridley points out, the "cloud" was evolving even before the internet came along but, catalyzed by its uber-connectivity, knowledge has literally gone viral.

George Gilder takes that theme and really sprints with it, asserting that, "knowledge is not merely a source of wealth; it is wealth." His 12-point summary on "the new economics of information" following that statement, shown on page 3, is worth the time investment to read this essay just on its own.

While George dumbs-down his concepts so even a techno dweeb like me can grasp his message, you do need to give this some extra concentration. His recurring theme of "entropy," known in physics as the second law of thermodynamics, is particularly fascinating as he applies it to knowledge and its dissemination.

Interestingly, his essential points are remarkably similar to those of my esteemed partner, Charles Gave, who has come to much the same conclusions using an economic, versus technological, perspective.

Who knew a technologist and an economist could speak the same language? Too bad that doesn't seem to be the case in Washington.D.C., these days.

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THE NEED FOR A NEW ECONOMICS
George Gilder

Why is it that so many Americans seem to believe that government spending, fueled by debt or taxes, can drive economic growth and wealth creation? Why do they believe that low interest rates, enforced by the Federal Reserve, can somehow spur business and investment? Why do they imagine that money and consumer demand impel the economy forward?

The reasons, I believe, are rooted in an economic confusion between knowledge and power. Many economists believe that growth is impelled by the exercise of power, represented by money creation and by government spending and guarantees. By manipulating the so-called "levers of the economic machine," government power can enlarge demand, inducing businesses to invest and consumers to spend. This process is seen to generate the demand that fuels economic growth.

These images of the economy of power are part of the very creation story of economics in an era of new machines and sources of energy. The first economic models were explicitly based on the dynamics of the steam engine then impelling the industrial revolution. Isaac Newton’s physical "system of the world" became Adam Smith’s "great machine" of the economy, an equilibrium engine transforming coal and steam into economic growth and progress.

Exploring technology investments over recent decades, however, I found myself preoccupied less with sources of power than with webs of knowledge in a field of study called Information Theory. On one level this theory was merely a science of networks and computers. Its implications, however, would change our deepest concepts of the nature of wealth. It would show that wealth is not money or power or demand. It is essentially the accumulation of knowledge.

Information theory effectively began with Kurt Godel’s demonstration in 1930 that all logical systems, including mathematics, are intrinsically incomplete and depend on axioms that they cannot prove. This epochal finding is often obscured by elaborate explanations of the intricate mathematics he used to prove it. But as John Von Neumann in his audience was first to recognize, Godel’s proof put an end to the idea of the universe, or the economy, as a mechanism. Godel’s proof, as he himself understood, implied the existence of autonomous creation.

Godel’s proof led directly to the invention by Alan Turing of a universal generic computer, a so-called Turing machine. By this abstract conception, which became the foundation for all computer science, Turing showed that no mechanistic computer system could be complete and consistent. Turing concluded that all logical systems were intrinsically *oracular*.

Computers could not be Smithian "great machines" or Newtonian "systems of the world." They inexorably relied upon human programmers or *oracles* and could not transcend their creators. As Turing wrote, he could not specify what these oracles would do. All he could say was that "they could not be machines." In a computer, they are programmers. In an economy, they are entrepreneurs.

In 1948 a rambunctiously creative engineer, Claude Shannon, from Bell Labs and MIT, translated Godel's and Turing's findings into a set of technical concepts for gauging the capacity of communications channels to bear information.

Shannon resolved that all information is most essentially *surprise*. Unless messages are unexpected they do not convey new information. An orderly and predictable mechanism, such as a Newtonian system of the world or Smithian great machine, embodies or generates no new information.

Studying information theory for decades in my exploration of technology, I finally found the resolution to the enigmas that currently afflict most economic thought. A capitalist economy is chiefly an information system, not a mechanistic incentive system. Wealth is the accumulation of knowledge. As Thomas Sowell declared in 1971: All economic transactions are exchanges of differential knowledge, which is dispersed in human minds around the globe. Knowledge is processed information, which is gauged by its news or surprise.

Surprise is also a measure of freedom and criterion of creativity. It is gauged by the freedom of choice of the sender of a message, which Shannon termed "entropy." The more numerous the possible messages that can be sent, the more uncertainty at the other end about what message was sent and thus the more information there is in the actual message when it is received.

In *Knowledge and Power*, I sum up information theory as the treatment of human communications or creations as transmissions down a channel, whether a wire or the world, in the presence of the power of noise, with the outcome measured by its "news" or surprise, defined as entropy and consummated as knowledge.

Since these communications or creations can be business plans or experiments, information theory supplies the foundation for an economics driven not by equilibrium and order but by surprises of enterprise that yield knowledge and wealth.

Information theory requires that such a process be experimental and its results be falsifiable. The businesses conducting entrepreneurial experiments must be allowed to fail or go bankrupt. Otherwise there is no yield of knowledge and thus no production of wealth. Wealth does not consist in material capital that can be appropriated by the greedy or the government but in learning processes and knowledge creations that can only thrive in freedom.

After all, the Neanderthal in his cave had all the material resources and physical appetites that we have today. The difference between our own wealth and Stone Age poverty is not an efflorescence of self-interest but the progress of learning, accomplished by entrepreneurs conducting falsifiable experiments of enterprise.

The enabling theory of telecommunications and the internet, information theory offered me a path to a new economics that could place the surprising creations of entrepreneurs and innovators at the very center of the system rather than patching them in from the outside as

"exogenous" inputs. It also showed that knowledge is not merely a source of wealth; it is wealth. Summing up the new economics of information are twelve key insights:

1) The economy is not chiefly an incentive system. It is an information system.

2) Information is the opposite of order or equilibrium. Capitalist economies are not equilibrium systems but dynamic domains of entrepreneurial experiment yielding practical and falsifiable knowledge.

3) Material is conserved, as physics declares. Only knowledge accumulates. All economic wealth and progress is based on the expansion of knowledge.

4) Knowledge is centrifugal, dispersed in people's heads. Economic advance depends on a similar dispersal of the power of capital, overcoming the centripetal forces of government.

5) Creativity, the source of new knowledge, always comes as a surprise to us. If it didn't, socialism would work. Mimicking physics, economists seek determinism and thus erroneously banish surprise.

6) Interference between the conduit and the contents of a communications system is called noise. Noise makes it impossible to differentiate the signal from the channel and thus reduces the transmission of information and the growth of knowledge.

7) To bear high entropy (surprising) creations takes a low entropy carrier (no surprises) whether the electromagnetic spectrum, guaranteed by the speed of light, or property rights and the rule of law enforced by constitutional government.

8) Money should be a low entropy carrier for creative ventures. A volatile market of gyrating currencies and grasping governments shrinks the horizons of the economy and reduces it to high frequency trading and arbitrage in a hypertrophy of finance.

9) Wall Street wants volatility for rapid trading, with the downsides protected by government. Main Street and Silicon Valley want monetary stability so they can make long term commitments with the upsides protected by law.

10) GDP growth is fraudulent when it is mostly government spending valued retrospectively at cost and thus shielded from the knowledgeable judgments of consumers oriented toward the future. Whether fueled by debt or seized by taxation, government spending in economic "stimulus" packages necessarily substitutes state power for knowledge and thus destroys information and slows economic growth.

11) Analogous to average temperature in thermodynamics, the real interest rate represents the average returns expected across an economy. Analogous to entropy, profit or loss represent the surprising or unexpected outcomes. Manipulated interest rates obfuscate the signals of real entrepreneurial opportunity and drive the economy toward meaningless trading and arbitrage.

12) Knowledge is the aim of enterprise and the source of wealth. It transcends the motivations of its own pursuit. Separate the knowledge from the power to apply it and the economy fails.

The information theory of capitalism answers many questions that afflict established economics. No business guaranteed by the government is capitalist. Guarantees destroy knowledge and wealth by eliminating the precondition of falsifiability. Unless entrepreneurial ideas can fail or

businesses go bankrupt, they cannot succeed in creating new knowledge and wealth. Epitomized by heavily subsidized and guaranteed leviathans, such as Goldman Sachs, Archer Daniels Midland, Harvard and Fanny Mae, the crisis of economics today is crony statism.

The message of a knowledge economy is optimistic. As Jude Wanniski wrote, "Growth comes not from dollars in people's pockets but from ideas in their heads." Capitalism is a noosphere, a domain of mind. A capitalist economy can be transformed as rapidly as human minds and knowledge can change.

As experience after World War II when US government spending dropped 61 percent in two years, in Chile in the 1970s when the number of state companies dropped from over 500 to under 25, in Israel and New Zealand in the 1980s when their economies were massively privatized almost over-night, and in Eastern Europe and China in the 1990s, and even in Sweden and Canada in recent years, economic conditions can change overnight when power is dispersed and the surprises of human creativity are released.

Perhaps the most powerful demonstration that wealth is essentially knowledge came in the rapid post world war II revival of the German and Japanese economies. Nearly devoid of material resources, these countries had undergone the nearly complete destruction of their physical plant and equipment. As revealed by decades of experience with unsuccessful ministrations of foreign aid, the mere transfer of financial and political power is impotent to create wealth without the knowledge and creativity of entrepreneurs.

Information Theory is a foundation for revitalizing all the arts and sciences, from physics and biology to mathematics and philosophy. All are transformed by a recognition that information is not order but disorder. The universe is not a great machine that is inexorably grinding down all human pretenses of uniqueness and free will. It is a domain of creativity in the image of a creator.

In the same way, capitalism is not a system of equilibrium; it is an engine of disruption and invention. All economic growth and human civilization stem from the surprises of creativity and the growth of knowledge in a domain of constitutional order.

The great mathematician Gregory Chaitin, inventor of algorithmic information theory, explains that to capture the surprising information in any social, economic, or biological science requires a new mathematics of creativity imported from the world of computers. He writes: "Life is plastic, creative! How can we build this out of static, eternal, perfect mathematics? We shall use post-modern math, the mathematics that comes after Godel, 1931, and Turing, 1936, open not closed math, the math of creativity…"

Entropy is a measure of surprise, disorder, randomness, noise, disequilibrium, and complexity. It is a measure of freedom of choice. Its economic fruits are creativity and profit. Its opposites are predictability, order, low complexity, determinism, equilibrium, and tyranny.

Predictability and order are not spontaneous and cannot be left to an invisible hand. It takes a low-entropy carrier (no surprises) to bear high-entropy information (full of surprisal). Incapitalism, the predictable carriers are the rule of law, the maintenance of order, the defense ofproperty rights, the reliability and restraint of regulation, the transparency of accounts, thestability of money, the discipline and futurity of family life, and a level of taxation commensuratewith a modest and predictable role of government. These low entropy carriers bear all ourbounties of surprising wealth and progress.

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