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Economic and Market Commentary

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It's been said that a riddle is a universal art form. Riddles have been around for at least 4000 years. Every civilization on every continent has constructed them. The Babylonians, Hebrews, Arabs and Persians have all had their riddles. Riddles have been written in every language, even societies without written language have passed them down through the generations using oral tradition.

Unlike myths and legends that span the same period, riddles serve a different purpose. Whereas myths and legends are designed to ingrain an acceptance of societies' norms and values, riddles are designed to challenge the intellect and problem solve. Often that problem solving involves thinking outside the box, and a correct answer helps the participant to reorient their assembly of facts which ultimately enhances critical thinking.

So, not only are riddles universal throughout societies, but they often traverse cultures and continents. Take, for example, the old Germanic riddle, often carried by merchants and seamen, that has traveled the globe for more than a thousand years:

Two-legs sat on three-legs and ate one-leg
Then four-legs came and took one-leg from two-legs
Then two-legs took three-legs and with it struck four-legs
So that four-legs let one-leg go.

The metaphor here is that two-legs is a person, three-legs is a stool, four-legs is a dog, and one-leg is a ham hock.

Here's One for You

What do a sportswriter and a chimpanzee have in common? If you don't already know, the answer will soon be revealed to you. Part one of our parable starts with a brief history of one of America's most successful magazines, *Sports Illustrated*.

Until the mid-twentieth century, there was no weekly publication that covered current sporting events across a spectrum of interests. It took Henry Luce, founder of *Time* and *Fortune* magazines to take on that challenge. In 1954, Luce launched *Sports Illustrated* much to the dismay of his advisers and board of directors. He felt the country had an appetite for well written, well

photographed sporting events. Further, he felt his timing was right given the American prosperity at that time and the increasing popularity of television. His instincts ultimately proved him correct, and within the decade, the magazine had a large and loyal following.

Over time, *Sports Illustrated* adopted a formula that included one long feature story in each edition. The magazine's editors sought out the finest journalists of the day to write for them. Names included Walter Bingham, a staff writer for almost 35 years, George Plimpton, Paul Zimmerman, Kurt Vonnegut and Drew Ortiz.

The magazine reinvented offset printing which enabled them to print sharp and vibrant color photos to go with their timely and well written news. They innovated with their ever popular "Swimsuit" and "Sportsperson of the Year" issues and annual "Sportsperson Legacy Award" issue which recognized former sports figures who embodied the ideals of sportsmanship, leadership and philanthropy as vehicles for changing the world.

Across the Pond

Roughly 3000 miles east of New York City where the editorial staff of Sports Illustrated are housed lies the small town of Saint-Affrique in Southern France. The town was founded more than 1500 years ago when locals established permanent residence around the tomb of the Bishop of Comminges, Saint Affricaine.

The Sorgues River passes through the center of town, a tributary of the Dourdou de Camares. For the next thousand odd years, the small sleepy town enjoyed a bucolic existence. That is, until the French wars of religion began in the early 1500s. Tensions had long existed between the Catholic majority and the Protestant sect known as the Huguenots. When King Henry II of France passed away, his widow, Catherine de Medici, then found herself in the middle of a struggle between powerful nobles vying for religious dominance.

The confrontation continued to escalate. Other European powers soon took sides with the Savoys (a royal dynasty in what would one day become Italy) and Spain backing the Catholics while England and the Dutch backed the Protestants. Eventually Catherine came down hard on the side of the Catholics and backed the 1572 St. Bartholomew's Day Massacre. Catholic mobs killed thousands of Protestants throughout France. At the time, many prominent Protestant nobles found themselves in Paris for the wedding of the Catholic King's sister, Margaret, to the Protestant King Henry III of Navarre. They never left the city alive. Not immune from the bloodshed, most of the Protestants in Saint-Affrique also perished.

The fighting continued for the next 25 years and only ceased when King Henry IV of France granted the Huguenots substantial rights and freedoms by signing the Edict of Nantes. Saint-Affrique resumed its pastoral existence without ever growing to a town of more than a few thousand people. None of the town's citizenry ever produced any offspring that set the world on fire. A musician here, a general there. That is, until 1871, when young Felix entered the world.

A Star is Born

His name was Felix Edouard Justin Emile Borel. The son of a Protestant pastor and his wife, Felix was born with a most remarkable mind for mathematics. By age 18, he was awarded a full scholarship for advanced studies at the "Ecole Normale Superieure" and also won first place at the "Concours General," an annual competition that attracted Europe's great mathematicians.

By the early 1890s, young Felix, known to his friends as Emile, was a full professor who published his first thesis, "On Some Points in the Theory of Functions." Over the next four years, he lectured at the university of Lille and published 22 additional papers before returning to Ecole Normale, where he was appointed "Chair of the Theory of Functions," a position he held for almost 45 years. During that span of time, he pioneered positions on "Probability Theory" Measure Theory," "Games of Strategy," and "Thought Experiments." It is the latter that he is most well remembered for today.

Bring In the Chimps

It's Emile's work in "Thought Experiments" in 1913, that later became known as "The Infinite Monkey Theorem," a concept that analyzes the probability of occurrence. Its charming name comes from the example of if you had an infinite number of chimpanzees, and an infinite number of typewriters, and an infinite amount of time, one of these chimps, barring punctuation, could type Shakespeare's "Romeo and Juliet."

Here's how the theorem works: Just take the title, "Romeo and Juliet." The word Romeo has five letters. Let's say our chimpanzee's typewriter only has 26 keys, one for each letter of the alphabet. The odds that our chimp will first strike the letter "R" is one in 26. The chance that he or she will next type an "O" is one in 676 (26 x 26). The chance that it will now type an "M" is one in 17,575 (26x26x26) and so on.

We all know there is no eternal pool of monkey typists. (Yes, I do know that chimpanzees are not monkeys; they are apes, along with gorillas and orangutans. But they have always been associated with "The Infinite Monkey Theorem.") But here's where it does become very interesting: We are in the infancy stages of "generative artificial intelligence," and that's why Emile Borel's work of more than 100 years ago is presently garnering such renewed widespread attention.

The Potential is Staggering

In the most basic terms, Artificial Intelligence (AI) harnesses machines and software as opposed to human intelligence. It might be said that its origins date back to Alan Turing's, "Theory of Computation." Turing began thinking about machine intelligence as early as 1941. Today, AI is widely used throughout industry, government, science and medicine. Every time you ask SIRI to do something, or Netflix sends you a recommendation for something they think you would like, you are interacting with AI. These are clever, sometimes helpful, sometimes annoying applications of AI. The bigger picture is how science is propelling technology forward.

In broad terms, the “Large Language Model” is the direction science is moving in. That is to say, trying to amass the largest library of data possible so that AI can be used as a “super intelligence” vehicle relying on a centralized system of extreme knowledge-solving problems without human involvement. For some of us, this is quite exciting, for others quite scary. There are those who are reminded of Hal 9000 in Stanley Kubrick’s *2001:A Space Odyssey*.

A second application would fall under “general artificial intelligence,” which most people are familiar with since Open AI rolled out ChatGPT in November of 2022. In this case the technology is trained or developed to self-teach in a specific discipline. A program could be taught to write, for example, with ever improving capabilities, but it could never cross over and, let’s say, design a website. Simply put, it wasn’t programmed to do so.

The movement in AI that many find the most potential in improving humanity’s future falls under a heading most commonly referred to as “Infinite Intelligence.” Rather than AI taking on the responsibility of trying to understand every domain as in “Super Intelligence,” “Infinite Intelligence” wants to develop an infinite number of “experts” with the equivalent of a Ph.D. in a specialized field all working together on a specialized task. This is where an analogy has been made to having the ability to create an infinite amount of super smart monkey typists.

Think of it This Way

The United States has a population of approximately 330 million people. In that population, we have approximately 19,500 oncologists. What if you could create 1000 times that many oncologists through AI. Imagine the problems that could be solved. The time line is not very far off. In fact, in some fields, that is exactly what is happening now. Case in point: Protein synthesis and degradation often result in tumor development and progression in cancer patients. Scientists at the European Bioinformatics Institute have developed AlphaFold2, an AI system capable of predicting protein 3D structure from its amino acid sequence in hours rather than months or even years through trial-and-error experimentation.

Now, imagine extending this “Infinite Intelligence” approach to the fields of chemistry, biology and mathematics. The potential discoveries are boundless and the potential improvement to the human condition staggering.

Our planet has a current population of approximately eight billion people. If we could artificially produce 1000 times more highly educated entities, it would be comparable to tapping into the best and brightest of a planet based on a population of eight trillion people without putting any further strain on our planet’s natural resources.

Let Me Bring It Home

You’ll remember that at the beginning of the commentary I posed a riddle: What do a sportswriter and a chimpanzee have in common? Sixty years ago, a logical answer, given the narrative I’ve shared, could have been a typewriter. Alas, typewriters are talismans of days gone by. Just try to buy a typewriter ribbon today. I’m afraid the answer is more sinister for our riddle identifies the best and the worst that AI can represent.

Let's start with the worst. When I gave a brief history of *Sports Illustrated*, I ticked off the names of some wonderful writers including the likes of Plimpton, Zimmerman and Vonnegut. New to the list was Drew Ortiz. Drew had recently written a featured illustrated article recounting his formative years growing up on a farm in America's heartland. He wrote about his embarrassment in being locked in a press box after stadium security had all gone home. You could feel his anxiety and fear over trying to meet deadlines when the words just eluded him.

As it turns out, our concern and empathy were misplaced. Why? Because Drew Ortiz is not a sportswriter. In fact, he is not a human but rather a figment of AI. The stories and photos were all concocted by machines and software. If that wasn't bad enough, it turns out the publisher and senior editors of the magazine were cognizant of the fact and had used numerous other AI generated articles in the past.

When the Ortiz story broke, *Sports Illustrated's* human writers, editors and photographers were mortified and extremely vocal. When journalistic sources can't be trusted, it not only jeopardizes the integrity of the entire Fourth Estate, it undermines all institutions including academics, and most importantly, government itself. Generative AI has been creating video, text, photographs, films and writing. Pieces that are often nearly indistinguishable from the genuine. We've all been entertained by generative AI, but in the wrong hands, it can lead to manipulation and even violence. Just in the last year, we've seen photos of Donald Trump in an orange prison jump suit, Pope Francis in a puffer coat and a terrorist bomb go off on the grounds of the Pentagon, all the invention of generative AI in the wrong hands.

Because this is a presidential election year, a very contentious political season will continue to unfold. It's also the first presidential election where generative AI can be used for undemocratic purposes. AI can easily be weaponized, and we need to be more vigilant when it comes to misinformation, privacy, biases and fairness.

Now, just as every coin has two sides, the flip side of our Ortiz debacle is how AI is already helping society push the envelope forward. We've already touched on the incredible advancements in medicine, both now and just around the corner. And beneficial AI is present in so many other facets in our lives. Educators are already using it to produce customized lesson plans, minimize administrative tasks which enable them to spend more time with students. AI is already providing voice assistance for students lost in the complexities of an assignment.

With identity theft becoming more and more prevalent, AI is enhancing facial recognition with "Face Filters" to better protect our identities. Everyday navigational aides are improved by AI's use of "Graph Neural Networks" along with "Convolutional Neural Networks" to enhance our GPS capabilities in navigating around road accidents and traffic jams.

AI is dramatically improving agriculture by being able to identify soil deficiencies and defects using computer vision robotics and machine learning capabilities. AI bots can harvest crops more efficiently than ever. Business and industry are rapidly adapting to AI to improve flaw detection in manufacturing and threat prevention along with transport management. It's often said that AI contains the biggest shift ever seen in the technology landscape. Although still in its infancy, we

are witnessing a 21st century industrial revolution, one that we need to view with our eyes wide open to avoid the chicanery of the Drew Ortizes of the world.

Conclusion

The majority of Wall Street analysts had started 2023 off by predicting a possible recession, elevated inflation and a weak equities market which would eventually take its toll on the overall economy. After all, the Federal Reserve had raised interest rates at the fastest pace in 40 years, inflation was nearing double digits and we saw the failure of several high-profile banks.

As is often the case, the pundits were wrong. Unemployment remained low, inflation began to come down and the economy, as measured by the GDP, grew at a slow but steady pace as did the market, complete with its usual bouts of volatility. Add to the mix a contentious presidential election year where, according to one recent Gallup Poll, 75% of Americans wished they had a different set of candidates to choose from than they had in 2020. That's one wish that doesn't look like will come true. Between the nature of our upcoming election and the geopolitical conflicts around the world, it's safe to assume the 2024 equities markets will continue to show volatility, but the economic expansion along with a sustainable bull market should continue throughout the year, most likely at a more muted pace. The Federal Reserve has signaled, at least for now, that they are done raising rates. Barring a Black Swan event, analysts predict anywhere from zero to six rate cuts in 2024. Inflation should continue to trend down, in part because unemployment should modestly rise, and Americans are close to having spent the wad of cash they built during the Covid pandemic.

Perhaps the biggest and most often overlooked reason to expect a growing economy is the fact that our country is now in a wartime spending cycle. The current administration has proposed a $105 billion spending package for military and humanitarian aid to Ukraine, Israel, Taiwan and to beef up our own homeland security, particularly on the Southern Border. Congress has already passed a $59 billion+ CHIPS bill for the U.S. semi-conductor industry. This money will create jobs and reduce our dependency on foreign (as in China) chip imports. Parenthetically, many of these chips are used in AI.

At the same time, we need to rebuild our own defense stockpile as well as invest in our decaying infrastructure (highways and bridges). Additionally, our strategic oil reserve hasn't been this low since the Arab Oil Embargo of the early 1970s. This reserve will have to be built back up, resulting in support for our domestic energy industry. With so much federal money flowing through the economy, a harsh recessionary year appears unlikely. A more probable outcome will be a year of relatively low unemployment, declining inflation, stable if not modestly declining interest rates along with a slow growing economy and more normal equity market activity than the highs and lows of the past couple of years.

It's my hope this winter is a happy and healthy time for you. As always, with...

Best Regards,
Ray Lent
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