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3Q26 Investment Letter

The Erdős Problem

Mathematics can be a war of attrition. The most daunting problems eventually get solved – but sometimes only after decades of persistence. In the case of the **Erdős problem**, it was 80 years in the making. Posed in 1946, it asks a deceptively simple question: if you place dots on a sheet of paper, how many pairs can be exactly one unit apart? Paul Erdős conjectured that even the most sophisticated arrangement could perform only slightly better than a simple grid. Then came artificial intelligence (AI). This year, an OpenAI reasoning model stopped trying to improve the familiar grid and looked beyond traditional geometric thinking. It approached the problem in a way mathematicians had not for 80 years, uncovering a new family of point arrangements that produced far more one-unit connections. The fusion of mathematics and creativity demonstrated AI's capabilities in ways that were both remarkable and unsettling. The Erdős problem also serves as a microcosm of an important investor consideration this quarter – has AI become more of a problem or a solution?

Financial markets have been shaped by many forces this year, but atop the list is investors' efforts to answer the questions that AI presents. Has the market gotten ahead of itself, over-allocating capital to an unproven technology? Or is artificial intelligence laying the foundation for the next great wave of economic productivity, much like the internet or electricity before it? The answer has profound implications – not only for technology companies, but for the broader economy and the capital markets financing it. Like the Erdős problem, the answer will eventually become clear. Markets, however, rarely wait for certainty; they discount tomorrow in advance. Our task is not to predict the future with perfect precision, but to apply current mathematics, science, and evidence to position portfolios for what comes next. As with any hard problem, patience and discipline can matter more than the pursuit of certainty.

> **"Why are numbers beautiful? It's like asking why Beethoven's Ninth Symphony is beautiful. If you don't see why, someone can't tell you. I know numbers are beautiful. If they aren't beautiful, nothing is."**
>
> **—Paul Erdős**
>
> **As quoted in Paul Hoffman's *The Man Who Loved Only Numbers* (1998)**

There has been a tug of war this quarter as the perception of AI shifted from problem to solution, and back again. The S&P 500 tells the story as it started the quarter at 7,499, stumbled to 7,314 on July 29, and recovered to 7,686 by the end of August. It was a dizzying ride, but one that still produced a gain of approximately 2.5%. The strength extended beyond U.S. Large Cap stocks. Through August, the S&P 500 had gained 13% year to date, while other equity segments performed even better: the Russell 2000 Small Cap Index advanced 20%, and the MSCI Emerging Markets Index gained 24% in U.S. dollar terms[i]. Fueling these returns have been robust earnings and a resilient economy. Although fixed-income performance was generally flat, the broader market results suggest that investors increasingly view AI spending as a productive investment rather than unchecked speculation.

There is useful precedent in Silicon Valley's longstanding mantra to "move fast and break things." AI has been a transformative economic force. Freelance copywriting agencies and low-end graphic-production shops are some industries adversely affected by AI adoption. This dynamic is unnerving but normal.

The 1990s mainstreaming of the internet is a close analog. Newspapers and encyclopedias would face stiff competition from the likes of Google. Even boutique travel agencies would be impaired by the arrival of Travelocity and Expedia. The internet revolution was not a straight line, and the AI revolution is unlikely to be one either. Things may break, but this has presented opportunities for new business models and the disciplined and dispassionate investor along the way – which is the approach we have advocated. Amazon was a vivid exhibit this quarter.

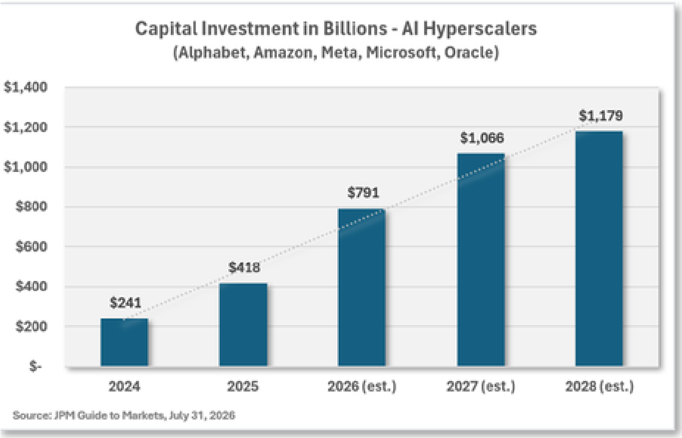
The Everything Quarter

The hyperscalers – Amazon, Alphabet, Meta, Microsoft, and Oracle – are slated to deploy approximately $790 billion of capital in 2026 and over $1 trillion in 2027 to build the AI ecosystem[ii]. The scale of this spending has become a new form of market stimulus, echoing the effects of accommodative fiscal and monetary policy. Yet, as we saw with Amazon, investors have repeatedly reassessed their capital decisions, swinging from optimism to skepticism – and back again – in a matter of weeks. Amazon has become more than the "everything store" – its volatile stock is a temperature gauge on AI sentiment. For investors, the quarter ultimately became a referendum on whether Amazon's AI spending was justified.

Andy Jassy, Amazon's CEO, has encouraged exactly this mindset. As he put it in a memo to employees:

"You need to invent and experiment like crazy. Many of these experiments will fail, and it might feel like you're getting nowhere. But, your culture must possess the tenacity to keep at it."

-Andy Jassy (April 10, 2026)[iii]



But funding these experiments became a worry when Amazon tapped the credit markets for $25 billion of fixed-rate notes in mid-July. It not only created angst within the bond markets as corporate yields rose in response, but the fear spilled into the equity markets as well. Amazon's stock price fell from $247 on July 17 to $232 on July 24 – a decline of 6.1%. Funding the AI buildout has increasingly shifted to the debt markets. Collectively, the hyperscalers have issued approximately $194 billion of debt this year[iv]. As the hyperscalers built the infrastructure underpinning AI, the surge in debt issuance briefly became an exit signal for nervous investors. But only for a moment.

Amazon reported blockbuster earnings on July 30. Jassy said that Amazon's AI and chips businesses had each exceeded annual revenue run rates of $25 billion[v]. Amazon's AI-powered shopping assistant, which recommends and compares products, saw active users nearly double during the quarter. Together, these developments reassured investors that Amazon's AI investments were beginning to translate into tangible business results. On July 31, the stock surged 15.3% for the day, which was the first time it gained that much in a single trading day since 2012[vi]. The anxiety that had gripped investors only weeks earlier quickly faded.

The strength has extended well beyond Amazon. Earnings season demonstrated that most industries are thriving in this increasingly digital landscape. As we stated in our last investor letter:

"Across sectors, prior investments in AI and technology are driving efficiency and productivity, underpinning current profitability. And companies are not slowing down."

S&P 500 earnings increased 52% year-over-year in the second quarter, following growth of 28.6% in the first quarter [vii]. Although mark-to-market gains on Alphabet's and Amazon's investments – in Anthropic, notably – helped inflate the headline figure, the underlying strength was broad-based with healthcare the only major sector to report an earnings contraction, declining 7% year-over-year [viii]. The hyperscalers are laying the digital tracks that allow companies across the economy to operate more efficiently, productively, and innovatively – and the results are beginning to show.

When it comes to the bottom line for Corporate America, AI has been more of a solution. Could it be in other ways? The new Fed Chair hopes so.

The Sound of Silence

The periods between earnings reports can create financial air pockets in which rhetoric temporarily overwhelms results. Now, Kevin Warsh, the new chair of the Federal Reserve, is introducing a similar dynamic with monetary policy. By deemphasizing forward guidance, he is allowing incoming data to speak more directly rather than signaling a predetermined path for interest rates. The irony is that less communication from the Fed may leave investors to fill the resulting silence with even more speculation. Monetary policy is simply too consequential to escape interpretation.

At Callan Family Office, we have long believed that innovation is ultimately disinflationary. Now the new Fed chair sees one of its longstanding mandates – keeping inflation low – receiving a helping hand from a modern digital phenomenon. Warsh said the following:

"AI will be a significant disinflationary force, increasing productivity and bolstering American competitiveness."

–Kevin Warsh, *The Wall Street Journal* **(November 16, 2025)**

The emergence of Google, Travelocity, Expedia, and other internet-era businesses ushered in consumer cost savings. More broadly, the quality-adjusted consumer price index for computers, peripherals, and smart-home assistants declined approximately 63% between December 2007 and July 2026 – even as the capabilities of those products advanced dramatically [ix]. History suggests that innovation tends to be disinflationary. If AI follows the path of previous technological revolutions, it may ultimately become one of the Federal Reserve's strongest allies in achieving price stability.

Interest rates remain one of the principal fulcrums upon which financial markets turn, influencing everything from the cost of capital to the relative attractiveness of competing asset classes. A stable rate environment reinforces our conviction in asset classes that are particularly sensitive to the cost of capital, including Venture Capital and Small Cap Equities. When the Federal Reserve left the federal funds target range unchanged at 3.50%–3.75% on July 29, its actions aligned with its more restrained messaging.

The Fed's data-dependent posture leaves the future path of interest rates open. Yet, if AI ultimately proves to be both productivity-enhancing and disinflationary, it could do more than influence monetary policy – it could reshape existing industries and help create entirely new ones.

Renewed Dynamism

Anthropic CEO Dario Amodei gave a stark forecast in May 2025: AI could eliminate up to 50% of entry-level white-collar jobs within one to five years. It is still a jarring forecast, but precedent suggests something different here as well. Yes, this wave of AI-driven automation may replace more *current* jobs than it creates, but the creation of *new* occupations should not be overlooked. Business formation in professional, scientific, and technical services – industries with significant exposure to AI – has increased approximately 45% since the launch of ChatGPT[x]. More broadly, the Census Bureau projected that business applications submitted in July 2026 would produce approximately 30,000 new employer businesses within four quarters. AI has been unleashing a wave of entrepreneurship that does not neatly align with the headline alarms. It does align with precedent, though.

Innovation is not limited to technology. Like the Erdős problem, new thinking within the financial markets helps develop new solutions to longstanding investment problems. One emerging example is private-credit secondaries, where annual transaction volume has grown from $2 billion in 2020 to $20 billion last year and could exceed $80 billion by 2030[xi]. With approximately $37 billion of dedicated capital available, we believe the strategy offers an increasingly attractive source of liquidity for existing investors and compelling risk-return potential for new capital[xii]. This dynamic echoes Say's Law – the notion that supply can create its own demand.

"It is production which opens a demand for products."
-Jean-Baptiste Say, *A Treatise on Political Economy* **(first published 1803)**

Classical economics suggests that this growing pool of capital will encourage additional market supply, meeting trapped capital in the credit space with a new liquidity solution.

In our digital age, there are still analog principles we embrace including enduring economic concepts, disciplined diversification, and the belief that corporate earnings remain the lifeblood of long-term equity returns. These principles are often tested during periods of volatility, yet they continue to guide our investment philosophy. But there is one other constant we look to amidst this change – the wisdom of Warren Buffett. As he once said:

"If you are emotional about investments, you're not going to do well." [xiii]

If we remain dispassionate and committed to these enduring principles, the odds of long-term investing success should improve. In the end, it can be simple math.

In Parting

The shifting perception of artificial intelligence has been one of the most consequential forces shaping the investment landscape this year, and navigating it requires a broad, disciplined perspective. Please reach out to your relationship team to discuss how these themes are incorporated into your portfolio.

If you would like a copy of *The Essays of Warren Buffett: Lessons for Corporate America,* Lawrence A. Cunningham – a collection of Buffett's timeless investment insights – please let your Relationship or Investment Manager know and we will gladly send one.

We deeply value your trust and partnership, and we are grateful for it.

For more information visit us at:
www.callanfo.com

[i] Morningstar Direct, index performance data through August 31, 2026

[ii] J.P. Morgan Asset Management, *Guide to the Markets*, July 31, 2026.

[iii] Amazon News, Andy Jassy shares 9 things he's learned over 28 years at Amazon, April 10, 2026.

[iv] Patturaja Murugaboopathy, "Hyperscaler Debt Binge Pushes Yields Up as Investor Demand Cools," Reuters, July 29, 2026.

[v] Amazon.com, Inc., "Amazon.com Announces Second Quarter Results," July 30, 2026.

[vi] "Amazon Soars by 15%, on Track for Biggest Jump Since 2012," *MarketWatch*, July 31, 2026.

[vii] John Butters, *Earnings Insight*, FactSet Research Systems, August 28, 2026.

[viii] Yardeni Research, August 22, 2026.

[ix] U.S. Bureau of Labor Statistics, "Consumer Price Index for All Urban Consumers: Computers, Peripherals, and Smart Home Assistants in U.S. City Average," retrieved through the Federal Reserve Bank of St. Louis, August 31, 2026.

[x] U.S. Census Bureau, "Business Formation Statistics," August 12, 2026.

[xi] Evercore Private Capital Advisory, *2025 Credit Secondary Market Survey*, January 2026.

[xii] Evercore Private Capital Advisory, *2025 Credit Secondary Market Survey*, January 2026.

[xiii] *Becoming Warren Buffett*, directed by Peter W. Kunhardt, HBO Documentary Films, 2017.

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