

thoughts

FROM HANSON+DOREMUS

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INVESTMENTS AND PLANNING

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And the Nobel goes to...

The Royal Swedish Academy of Sciences recently awarded the Nobel Prize to three economists for explaining how technological advances drive lasting economic growth. Joel Mokyr won for identifying “the prerequisites for sustained growth through technological progress,” while Philippe Aghion and Peter Howitt won jointly “for the theory of sustained growth through creative destruction.” It may seem obvious today that innovation drives prosperity, but a key insight of these laureates was that historically, sustained growth has been the exception, not the rule.

We like to zoom out to the big picture, and today we will take the very long view indeed. *The chart at the bottom (and up the side)* shows estimates of GDP per capita for western Europe going back to the year 1300. Notice two things: first, growth mostly stagnated for 500 years despite plenty of major innovations—the Prize literature cites the proliferation of windmills and the heavy plough, the printing press, and Newton’s laws of motion; second, how remarkable the growth since 1800 has been. So why not for 500 years? And then, why during the last 200?

Mokyr explains that two things must be present for continual benefits to accrue: 1) the development of an advancement paired with 2) an understanding of why it works. For example, hand washing during childbirth was recognized as leading to lower maternal mortality, but the practice was not adopted until decades later when Germ Theory explained why. Innovation must go hand-in-hand with understanding for advances to build upon each other in a useful (i.e. economic) way.

The environment in which these innovations land, Mokyr notes, is also important—since new technologies often replace the old, a society needs to be open to change. The risk is that those

of the establishment feel threatened and block progress. Aghion and Howitt’s contribution was creating an economic model for the process of the new destroying the old. If this is what drives growth, what is the right amount of “creative destruction” that makes business ventures worthwhile while rewarding newcomers? What kinds of institutions do we need—for R&D, for workers—to support that equilibrium?

It is no accident that the Academy is awarding this Nobel now, as AI-related innovation enters the mainstream. Keep in mind, too, that economic growth is not only measured by wealth per capita, but also the level of healthcare and education, the quantity of leisure, and quality of products. AI promises progress on all those fronts, but what world is here to meet it?

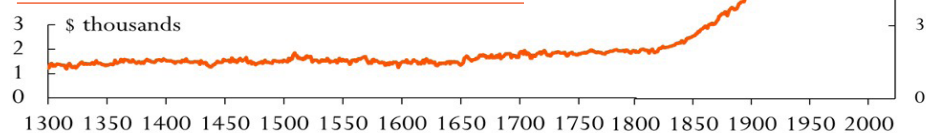
The long view reminds us that innovation alone does not guarantee progress in quality-of-life measures. Now, maybe what has emerged from the complex

interaction of science, technology, and society post-Industrial Revolution represents a new phase. Maybe we have outgrown the old mode and flourishing is more assured. Maybe we will continue to have strong institutions supporting honest scientific inquiry, where vested interests do not have the last word, and where the market force of creative destruction trumps incumbents. Maybe that is the environment in which this transformative AI technology is landing.

But if that narrative rings even a little hollow, this year’s Nobel Prize asks us to remember history, check in on society’s institutions, and not take progress for granted.

- Mark Andrews

GDP PER CAPITA OF WESTERN EUROPE



Source: Maddison Project Database; 2011 USD; average of France, Spain, Sweden, UK; papers by Álvarez -Nogal and Prados de la Escosura; Ridolfi and Nuvolari; Broadberry, Campbell, Klein, Overton, and van Leeuwen; Krantz and Schön



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The AI investment landscape evolves...

Today's investment headlines are chock full of articles debating whether a bubble is brewing in AI-related technology shares. Investor concerns on this issue are well-founded. According to JP Morgan, AI-related stocks have accounted for 75% of S&P 500 returns, 80% of earnings growth and 90% of capital spending growth since ChatGPT was first launched back in November of 2022. The risk to the market is further highlighted when you consider that the "Magnificent 7" stocks (whose fortunes are disproportionately tied to AI) now represent approximately 34% of the S&P 500's value.

To better understand the opportunities and risks associated with this latest innovation, let's step back and review the technology and its evolution over the past three+ years.

Large language models (LLMs) are one of the core technologies supporting AI. By utilizing large amounts of data and some sophisticated programming, LLMs can be "trained" to predict the most probable next word in a sequence. While these models have been around for years, Open AI's ChatGPT expanded on their capabilities by producing very human-like responses to questions over long, multi-turn conversations. In addition to being very user-friendly, ChatGPT excelled at understanding both nuance and context.

But a lot has changed since ChatGPT's release. Excitement around the potential

of this potentially game-changing technology has drawn hundreds of billions of dollars into the industry. Much of this cash has been spent building out the vast amount of computing capability required to train the LLMs which underpin AI. Meanwhile, whole categories of firms serving various parts of the business have emerged. The chart to the left (yes, created with the help of ChatGPT) outlines the various industry participants and the role they play today.

The companies that developed the large foundation models on which AI operates were the original driving force behind the technology. Some of these, like OpenAI, remain private but many are now publicly traded. While they have attracted billions, the path to profitability for these firms remains a work in process as they struggle to bring in sufficient revenue to offset escalating capital spending needs.

AI infrastructure firms provide the tools and data centers needed to build and train AI systems. Cloud providers like Amazon and Google fall into this camp as do less well-known firms like Databricks and Labelbox. AI hardware manufacturers design and manufacture the equipment that powers AI training. This sector, led by leading chip firms like TSMC and Nvidia, has been one of the biggest beneficiaries in the race to build out computing capability.

AI's ultimate productive use is one of the biggest questions on investors' minds today and this is where the AI application companies come in. These firms, many of which are software providers, are integrating AI into their offerings. The end

markets here can be quite broad (Grammarly checks for spelling and grammar errors in real time) or narrow (Insilico helps accelerate the design/discovery of new drugs). Thanks to the complicated and quick-moving nature of this technology, a full range of consultants have popped up to help companies assess how best to utilize AI. While this discussion describes the unique roles of each AI firm, some are also involved across a few layers of the landscape. It is important to note too the more recent trend of industry participants combining their efforts, through either joint ventures or outright acquisition, to achieve strategic advantage.

What might cause the outlook on AI to change? Anything that slows the pace of its adoption such as stricter regulations or the inability of end users to justify further AI investment. The introduction of a cheaper/more efficient alternative to current industry standards (think the release of China-based DeepSeek earlier this year) could accelerate adoption but unseat incumbents. Other forces, such as a change in the interest rate outlook or further global trade conflict, could hit high-flying AI stocks particularly hard.

As has been the case in past periods of technological innovation, the path forward is unlikely to be straight. For now, we are paying close attention to how AI is impacting our portfolio holdings while asking ourselves what we believe are the two most important AI-related questions today. First, what are the actual productivity enhancing applications of AI and second, who will make money off its adoption? Stay tuned for future articles on these questions.

THE AI INVESTING LANDSCAPE TODAY

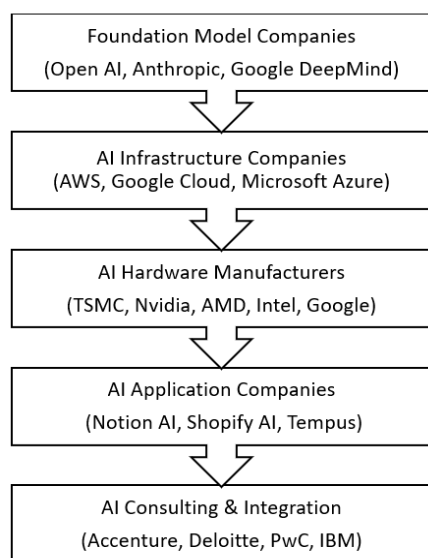


Chart created by Anne Doremus

Global flashpoints...Handicapping Taiwan today...

We are all watching the fighting in Ukraine and the Middle East in real time today. Both are certainly serious but neither involve a direct confrontation between the world's biggest powers, China and the U.S. The Taiwan issue, however, does. We would not be surprised if this resurfaces as a major flashpoint sometime during the remaining three years of the Trump administration.

Since Xi Jinping took power in 2012, he has made reunification with Taiwan a central feature of his "China Dream" revival plan. Xi has reportedly instructed the military to be prepared to attack the island by 2027. Recent U.S. administrations have acknowledged China's claim over Taiwan but without endorsing that claim (our "One China policy").

The Biden administration said it "does not support" Taiwan independence but claimed if Taiwan were attacked, we would defend it, although exactly how and to what extent was left unsaid. The Trump administration has been basically silent as to what it would do if China attacked the self-governed island democracy.

A direct attack on Taiwan by China might take a number of forms. China's Navy has performed numerous war drills around the island, and its Air Force has continuously probed Taiwan's defenses and entered Taiwan's air space. Earlier this year it was reported that China has built numerous barge-borne bridges (*see picture below*) which can offload non-amphibious vehicles and troops onto Taiwan's rocky coastline. In addition, China has developed hypersonic missiles which could effectively keep U.S. aircraft carriers well away from the Taiwan war theater.



Source: Adobe Stock

There are other options short of a direct attack on the island. These "gray zone" tactics might include either a full blockade of the island or a quarantine where the Chinese Coast Guard performs searches of ships, ostensibly to enforce customs regulations, halt the spread of disease, or to prevent weapons from reaching the island.

Andy Kessler, writing in *The Wall Street Journal* thinks the West has the tools necessary to stop a military invasion of Taiwan. The U.S. would "Putinize" China, cutting it off from financial markets. The West could also blockade China, stopping the shipment of oil and foodstuffs which the mainland relies on. A big question, however, is would the rest of the world work effectively with the U.S. to isolate China,

especially after our President has acted as a "rent-seeking landlord" with respect to tariff policies aimed at friend and foe alike? Taiwan is not Ukraine, and it might not elicit the same level of global support.

China is currently using a strategy which could forestall the need for a full-scale invasion—breaking the back of Taiwan's confidence and its will to resist. The Lowy Institute, an Australian think tank, estimates that by the end of this year, 119 countries, 62% of the UN's member states, will have endorsed China's sovereignty over Taiwan, including "all" efforts to achieve unification.

Taiwan's dysfunctional governing system is not helping to project a united front against China. The DPP, which favors independence, controls the presidency but the mainland-appeasing KMT party controls the legislature. This has led to policy gridlock.

Taiwan has a valuable trump card in TSMC which manufactures 90% of the world's most sophisticated semiconductor chips. The West does not want it to fall into China's hands. But skeptics question whether Taiwan's younger generation, which has grown up in economic affluence, actually has the will to fight. As some have said, Taiwan's youth are like "strawberries," beautiful on the outside, soft on the inside.

The Taiwan question could ultimately come down to Donald Trump. When Chairman Xi meets with Trump, possibly later this year, some expect he will propose a mega offer; you agree to our position on Taiwan, and we will give you the trade victory you have been chasing since the election. This could be the straw that breaks the camel's back. Polls show that 80% of Taiwanese today want to keep independence from China, but only 20% think this is feasible long term.

PIER TO PIER



Sources: Stylized image generated by ChatGPT

End-of-Year Financial Planning...

As cooler fall weather settles in and the final quarter of the year begins, many of us feel a renewed sense of focus. That “back-to-school” energy often extends beyond closets and calendars — it’s also the perfect time to revisit your financial to-do list. At Hanson + Doremus, we view this season as an opportunity to tie up loose ends, review progress, and prepare for the year ahead.

Each fall, we help clients complete several important year-end financial tasks. Chief among them: confirming that Required Minimum Distributions (RMDs) have been taken from retirement accounts, reviewing taxable portfolios for opportunities to offset gains through tax-loss harvesting, and rebalancing portfolios to bring them back in line with target allocations. These steps help ensure portfolios remain aligned with goals and risk tolerances, while also positioning them efficiently for the new year.

Beyond these core items, there are several other important deadlines and opportunities to keep in mind as 2025 comes to a close.

Charitable Giving

If charitable giving is part of your financial plan, year-end deadlines come up quickly. Donations of appreciated securities to a qualified organization or Donor Advised Fund (DAF) must be completed by December 31, 2025, to count for the 2025 tax year. Because processing can take time, we recommend submitting forms to your custodian (e.g. Schwab) by December 9th for mutual fund donations, December 16th for stock and bond donations, and December 23rd for internal Schwab transfers and wires.

Qualified Charitable Distributions (QCDs) from IRAs also need special attention — the receiving charity must cash the check by year-end for it to count towards your 2025 RMD and provide the associated tax benefits.

Retirement Account Contributions

Contributions to Individual Retirement Accounts (IRAs) and Roth IRAs can

be made up until the tax filing deadline — April 15th, 2026 for 2025 contributions. However, contributions to employer-sponsored retirement plans such as 401(k)s, 403(b)s, or SIMPLE IRAs must come from wages earned within the 2025 calendar year. If you’re hoping to increase contributions, be sure to update your deferral election with your employer before your final pay periods of the year.

529 College Savings Contributions

If you’re helping a child or grandchild save for education, contributions to 529 plans must be made by December 31st to qualify for 2025 state tax benefits. Many states offer deductions or credits for contributions to in-state plans. For example, Vermont residents receive a 10% state income tax credit on contributions to a Vermont 529 plan — up to \$250 per beneficiary for single filers and \$500 per beneficiary for married couples filing jointly.

Flexible Spending Accounts (FSAs)

Flexible Spending Accounts allow employees to contribute pre-tax dollars to cover qualified healthcare or dependent care expenses. Most FSA plans follow a “use-it-or-lose-it” rule, requiring funds to be spent by December 31st. Some employers do offer a small rollover amount or a short grace period, so check your plan details to avoid forfeiting unused funds.

Consider using any remaining balance for eligible expenses — from prescription eyewear to medical appointments — before the year closes.

Roth IRA Conversions

A Roth conversion involves moving funds from a pre-tax retirement account

(such as a traditional IRA or 401(k)) into a Roth IRA. The converted amount is taxable in the year of the conversion, but future qualified withdrawals from the Roth are tax-free.

Conversions must be completed by December 31st to count for the current tax year. This strategy can make sense if you expect to be in a higher tax bracket in retirement, want to leave a tax-free inheritance, or simply value the flexibility Roth accounts provide — particularly since they are not subject to RMDs. Again, plan for year-end processing delays and complete the necessary paperwork by December 15th.

Planning for Near-Term Cash Needs

As we rebalance portfolios toward year-end, we also encourage clients to plan for upcoming cash needs over the next 12–24 months. If you anticipate major expenses — such as a home project, new vehicle, or extended travel — it’s best to set aside those funds in cash or another conservative investment. Doing so helps protect against market fluctuations and ensures the money is available when needed.

Looking Ahead to 2026

Once you’ve checked off your 2025 financial to-do list, consider setting a few forward-looking goals for 2026. The start of a new year is a great time to build or update your financial plan, review your estate documents, and evaluate your insurance coverage. These steps help ensure your financial life remains organized, intentional, and well-positioned for the future.

As the year winds down, taking time for financial housekeeping can bring peace of mind and is also an opportunity to set the stage for a strong start in the year ahead.

Please remember that past performance may not be indicative of future results. Different types of investments involve varying degrees of risk, and there can be no assurance that the future performance of any specific investment, investment strategy, or product (including the investments and/or investment strategies recommended or undertaken by Hanson + Doremus Investment Management (“Hanson + Doremus”), or any non-investment related content, made reference to directly or indirectly in this newsletter will be profitable, equal any corresponding indicated historical performance level(s), be suitable for your portfolio or individual situation, or prove successful. Due to various factors, including changing market conditions and/or applicable laws, the content may no longer be reflective of current opinions or positions. Moreover, you should not assume that any discussion or information contained in this newsletter serves as the receipt of, or as a substitute for, personalized investment advice from Hanson + Doremus. To the extent that a reader has any questions regarding the applicability of any specific issue discussed above to his/her individual situation, he/she is encouraged to consult with the professional advisor of his/her choosing. Hanson + Doremus is neither a law firm, nor a certified public accounting firm, and no portion of the newsletter content should be construed as legal or accounting advice. A copy of Hanson + Doremus’s current written disclosure Brochure discussing our advisory services and fees is available upon request or at www.hansondoremus.com

