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Productivity, Democracy, Power and Truth: **The Influence of AI on Markets and Investing**

This note considers the macro impact of artificial intelligence (AI), which raises profound questions about how knowledge is obtained, what we mean by "truth" and what counts as "explanation."

AI is necessarily political—it would be a mistake to narrowly frame it as a quantitative topic. While there is a narrative of boosting growth, AI could also widen the distribution of wealth, which increases second-order social risks. It also raises questions about the future of democracy and introduces new types of geopolitical uncertainty. Moreover, AI might further entrench the power of corporations versus governments and labor.

The key strategic investment challenge is pricing the potential for higher growth and profit share versus the potential for greater fundamental macro uncertainty via societal pressures and geopolitics. Markets are quick to price the former but poor at the latter. AI also raises questions on the future of employment and retirement, the passivization of short-term investment strategies and who gets to control the development of new technologies.

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In meetings with CIOs, asset allocators and strategists around the world this year, a debate has often raged about whether we find ourselves in a new investment regime. We have laid out the case in recent research that deglobalization, demographics and climate change acting in concert raise the prospect of higher inflation and lower real growth. The question that frequently comes back across the table in meetings is "Yes, but what about AI?" The hypothesis implicit in this question is whether AI begets lower inflation and has the potential to increase growth to a sufficient extent to offset these forces.

Could AI be like the advent of the steam engine, lifting growth and productivity in a transformational way? Or maybe the printing press is a better analogy for bringing about a broader social and intellectual metamorphosis in how humans interact with the world? A potentially gloomier interpretation is to phrase this development in Marxist terms—about the power of capital versus labor and change in social structures. This is most clearly not a story that is demarcated as a quant, tech or coding issue. The topic is ultimately political, social and philosophical. This has implications for strategic investment and asset allocation.

In his masterpiece *We*, written 100 years ago, Yevgeny Zamyatin laid out the dystopian prospect of a world in which algorithms define the social and cultural experience and even all the most intimate interpersonal interactions. Does the roll-out of AI across society imply that we will follow such a path? The focus of this note is the macro implications of AI. We take a broad interpretation of the word "macro." AI has economic, social and epistemological implications. We would argue that none of these can be ignored in finance, at least not in setting strategic asset allocation, which, ultimately, always requires one to take a view on political and social forces. We would go as far as to say it would be naïve to leave out such views when setting long-run expectations.

At the end of this note we lay out a set of provisional strategic asset allocation implications for an AI world. In summary these implications are:

- Aim for a higher equity allocation than in a non-AI world, based on the potential impact on productivity and corporate power.

- Expect a higher level of risk, given the potential for greater political and geopolitical uncertainty. There is a difficulty in overly relying on government bonds to offset this, because the more existential risks posed by AI are to the entity of the nation state.

- Pursue diversifying return streams.

- Prepare for further shifts in the active-passive boundary.

- Re-focus analysts' time usage… and time horizons. Analysts will likely switch their emphasis to a longer-term view.

The difficulty in forming investment conclusions from the advent of AI comes in balancing near-term forces that could create an upward growth trajectory with other forces that account for distribution effects as well as social and geopolitical consequences that are potentially more insidious. However, we would argue that while financial markets rapidly price in innovations to growth they tend to do a terrible job of pricing in big, existential outcomes, especially when they involve a second-order social response. We see this play out in the history of the equity risk premium, as we discuss later in this note. So, pricing the positive and negative aggregate impact of AI will likely follow different processes for price formation. For all the pronouncements of AI evangelists, this innovation is, in a sense, just another technological development, with pre-existing sociopolitical structures likely to play a key role in determining AI's distributional wealth impact.

The debate over AI's role in the economy needs to be placed within the context of prior technological developments. After all, automation has a long history, and there has always been a particular fascination with automata that approximate human behavior. It seems appropriate that the Scottish Ballet's masterful restaging of *Coppélia* at Sadler's Wells this year (*Display 1*) was an immersive AI experience. The familiar story of the doll automata lends itself well to this contemporary retelling. The boundaries between human dancers and automata dancers blurred, and the choreography was fascinatingly unnerving. That seems a fitting analogy as the intellectual and fundamental implications of AI become clearer. The questioning subtitle that was added to the ballet was "What does it mean to be human?"

DISPLAY 1: A REINVENTED *COPPÉLIA* FOR THE AI AGE

For illustrative purposes only
Source: Scottish Ballet

The Impact of AI on Aggregate Growth

One of the core inputs for arriving at any view of strategic allocation is the prognosis for long-term economic growth. As we have pointed out in recent research,[1] the combination of a falling working-age population (ex-Africa and parts of South Asia), the likelihood of deglobalization, and the need to pay a price for energy that more accurately reflects negative externalities implies a future of lower growth than we've seen since the early 1980s. The impact and extent of deglobalization can be argued, and so can the impact of climate change on growth, but the case for demographic impact seems most clear. A smaller number of workers suggests, *ceteris paribus*, lower growth.

However, in recent meetings with clients, this point is almost ubiquitously followed by the question, "But what about AI?" The mass rollout of generative AI over the past year has led many to ask whether a new source of growth is at hand that is large enough to overturn these other macro forces. Well, *maybe*. There is no firm evidence either way. Forecasts for the impact of AI on growth are all over the place, which is nothing new. An inability to forecast changes in productivity has existed for a long time, possibly since the concept was invented.

We suggest that a more fruitful approach for the moment might be to reverse engineer the problem, asking what change in productivity growth would be needed to offset the triumvirate of global mega-forces: deglobalization, demographics and climate change. Our previous research suggests that the drag on global gross domestic product (GDP) growth could be on the order of −0.3% to −1.3% per year (*Display 2*).

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1 [A Triumvirate of Macro Mega-forces](#)

DISPLAY 2: IMPACT OF DEGLOBALIZATION, DEMOGRAPHICS AND CLIMATE CHANGE ON GLOBAL GDP GROWTH (%)

| Impact on GDP Growth (%)	Baseline Scenario	Bad Scenario
Working-Age Population Decline	−0.2	−0.7
Deglobalization Trade Impact	−0.1	−0.5
Climate-Change Impact	0.0	−0.1
Total	−0.3	−1.3

Historical analysis and current estimates do not guarantee future results.

As of June 9, 2023
Source: FactSet, Global Financial Data, International Monetary Fund, Thomson Reuters Datastream and AB

Thus the "reverse-engineering" approach to scaling AI implies that it would have to deliver an increase in productivity growth of at least this size. We can place this in the context of the range of historical changes in productivity growth between different US economic regimes since World War II (*Display 3*). The required increase is possible but at the top end of the historical range, so it would have to be significant. The conclusion is that, yes, it is possible that AI could deliver a productivity improvement of a scale that could offset these macro forces. However, the impact would have to be at the top end of that historical range, so building that in as an expected forecast would take a significant step. Moreover, in order to be useful to aid in reallocating assets, one has to consider the likelihood of effectively *forecasting* the time frame of this effect.

DISPLAY 3: PRODUCTIVITY RANGES OF DIFFERENT US ECONOMIC REGIMES
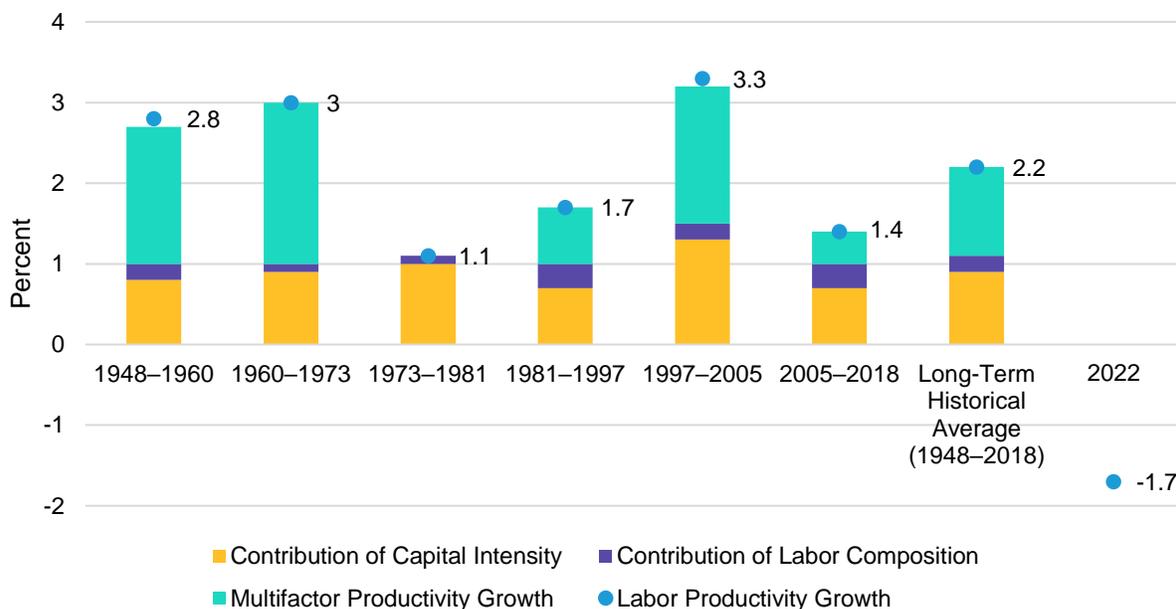
Historical analysis and current estimates do not guarantee future results.
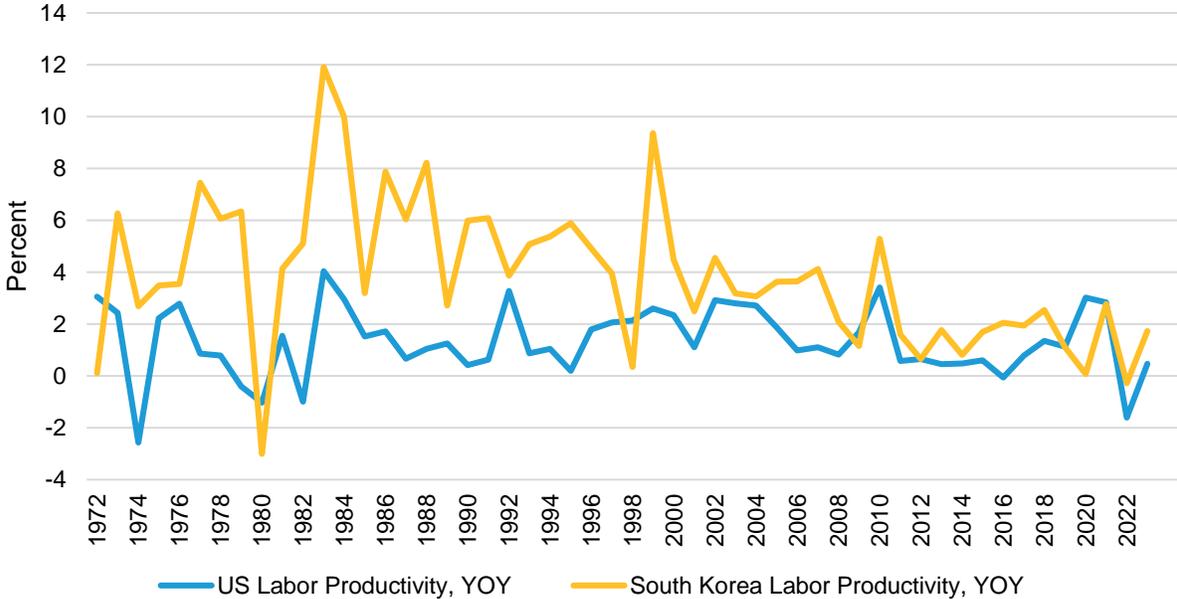
As of June 30, 2023
Source: US Bureau of Labor Statistics and AB

The difficulty here is that recent automation improvements have failed to show up in productivity statistics. It would be premature to see an impact from AI specifically, but given the technological advances in recent years and the huge investment in automation (in North America alone, robot orders rose by 28% in 2021 and 11% in 2022, according to the Association for Advancing Automation), one would have thought that they would show up as an increase in productivity.

A counterargument to the lack of productivity increase could be that, until very recently, robots have been introduced to very narrow areas of the economy—mostly for car production and heavy manufacturing. Only now, with flexible "co-bots," are they being adopted in a wide range of industries.

In *Display 4*, we show labor productivity growth since the 1970s and the apparent lack of increase despite recent investment in automation. We show the data for South Korea, as well, to make the case that this pattern also holds in countries with a very high degree of technological penetration.

DISPLAY 4: AUTOMATION HAS, SO FAR, FAILED TO SHOW UP IN PRODUCTIVITY STATS

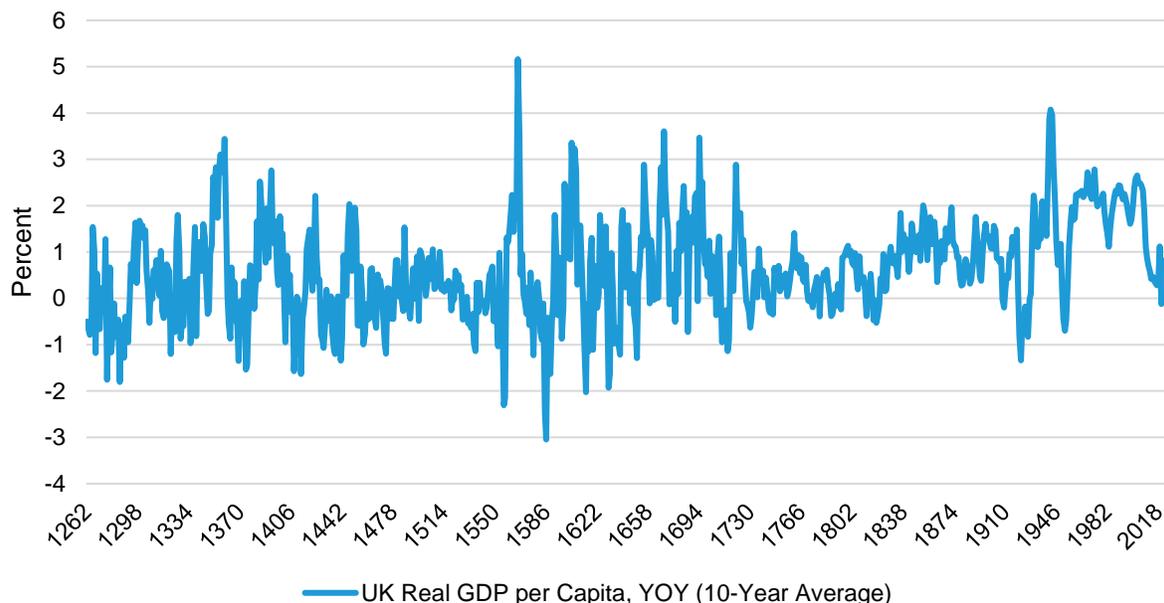**Historical analysis and current estimates do not guarantee future results.**
As of June 30, 2023
Source: Organization for Economic Co-operation and Development, Thomson Reuters Datastream and AB

If there is little obvious extra growth to show for recent investment in automation, it is likely a measurement problem. However, this issue matters if we attempt to forecast the aggregate growth potential from AI in the context of other forces acting at the same time. The issue also touches on another theme that runs through this note: What is the motivating animus of AI deployment? Is it to boost aggregate growth, improve quality of life, or is it merely another profit-maximizing exercise for the corporate sector?

Technological investment, however, can make a significant impact on economic growth. Evangelists for AI often equate it to the development of the steam engine—arguably the first technological development that raised per-capita growth since humans developed farming to improve on nomadic roaming. Looking at UK GDP over the past eight centuries (*Display 5*), the widespread adoption of the steam engine by 1800 marks a clear break in the series. For the six centuries prior to 1800, UK per-capita GDP growth was 0.39% annualized; after 1800, it has averaged 1.16%. If the steam engine comparison is correct, then the widespread adoption of AI could offset, and even potentially surpass, other strategic demographic, geopolitical and climate-related headwinds that otherwise seem destined to suppress growth. However, to look at AI only through a lens of aggregate economic growth misses the point; we think the broader impact on society must also be considered before one can contemplate the impact on financial markets and investing.

DISPLAY 5: UK REAL GDP PER CAPITA GROWTH (10-YEAR AVERAGE)

UK Real GDP per Capita, YOY (10-Year Average)

Historical analysis and current estimates do not guarantee future results.
As of December 31, 2022
Source: Maddison Project Database 2020, Thomson Reuters Datastream and AB

AI as Utopia…or Dystopia?

The debate on the role of AI in society and for economies overall is giving birth to a wave of new publications. Reviewing this literature is a useful starting point for understanding the broader impact of AI on society. Henry Kissinger has teamed up with Eric Schmidt, former Google CEO, and Daniel Huttenlocher of the Massachusetts Institute of Technology Schwarzman College of Computing to opine on this impact. The gravitas of the authors is unimpeachable, though as with other books written by committee, it is a dry read. They offer views spanning their considerable domains of experience, but your reviewer came away with an overall sense of a depressing prognosis for the future. The book correctly points out that, while previous waves of technology have displaced workers, societies ultimately adapted and were better off. With a nod to the possibility that the disruption could be faster this time, they allude to the idea that societies "need to be ready to supply the displaced not only with alternative sources of income but also with alternative sources of fulfillment."

The authors discuss the ability of generative AI to create falsehoods indistinguishable from reality and the impression of people doing or saying things that they have never done or said. They conclude that, without checks, this ability will likely "blur the line between reality and fantasy."

The section on world order, presumably penned by Kissinger, is possibly the most depressing part of the work. The potential role of AI in geopolitics is compared to the invention of nuclear weapons as a technological advance with the potential to change the world order and the way states interact. However, unlike with nuclear weapons, there is no established concept of deterrence for AI. Indeed, basic attributes of conflict are now open to debate—such as whether a conflict has even begun, with whom it exists and how far up the escalation ladder the conflict may be. The authors conclude that AI increases the inherent risk that preemption and premature use will escalate into conflict. When conflict starts, it will likely become much more unpredictable, because participants face tactics and strategy determined by nonhuman actors.

The biggest claim in the book is a fundamental statement of epistemology. They point out that, throughout human history, there have been two routes to attempt to understand the world: faith and reason. Their claim is that AI adds a third, which is, of course, a huge claim. However, variants of a theme around this topic connect several of the more philosophical books on AI's macro impact. It could be argued, perhaps, that knowledge gained though AI is an extension of reason. After all, the IT infrastructure

and theory that underlies the development of AI relies on a trail of scientific advances. However, there is a sense in which the way AI arrives at advances is indeed different. This is perhaps most apparent with respect to the concept of what constitutes an "explanation." If an AI process uses a highly complex pattern among data points that is not easily rendered into a model readily intelligible by humans, we may say the AI process does not offer explanation (even if it is effective at prediction). Because of that, we are inclined to agree with the declaration in Kissinger's opus that the nature of knowledge arrived at via AI is potentially different. This is possibly one of the most fundamentally novel aspects of the topic of AI.

AI could potentially tease out patterns in data (especially data on a huge scale) that are unrecognizable by humans, and it can use these patterns to make predictions that could not otherwise have been made. Lakatos suggested that the ability to make novel predictions is one of the core tests for an activity to be considered "scientific."[2] Leaving aside the issue of whether such a process could fit the definition of an explanation, there already are tangible examples of AI making such a prediction in a way that was impossible, or at least radically more time-consuming and costly, if attempted by humans. Protein folding used to be an extremely time-consuming, costly process with very high failure rates, but DeepMind's AI-driven AlphaFold tool was able to predict the structures of nearly 200 million proteins last year.[3] This discovery will dramatically accelerate scientists' ability to design and synthesize new proteins with specific properties and structural features using machine-learning algorithms, as MIT researchers recently demonstrated.[4]

Markets are unlikely to care in the slightest if this advance constitutes explanation or is a different kind of knowledge—investors will just buy the growth opportunity. However, this distinction may well matter at a societal level.

The question of whether AI offers a different route to knowledge is discussed at length by Meghan O'Gieblyn in a book with the wonderful title, *God, Human, Animal, Machine*. She specifically asks whether or not there is a need for theory anymore. If one feeds truly vast amounts of data into AI algorithms, then one can make predictions while dispensing with the need for a theory or intelligible explanation. O'Gieblyn refers to this worldview with the delightful phrase "ontology of vacancy." She claims that it leads to an epistemology where knowledge is based not in concepts themselves but on the relationships that constitute them. Thus, AI encourages us to abandon the question "why?" or, more prosaically, suggests that correlation is good enough and that we can give up trying to form models that describe causation. Perhaps, she provokingly hints, "meaning" may be too anthropocentric a concept and has to be given up. If all this leaves one feeling profoundly uncomfortable, it is probably no surprise. Judea Pearl characterizes deep-learning-style approaches as "fundamentally a curve-fitting exercise" that do not need models and are fundamentally not scientific, however effective they may be.[5]

O'Gieblyn's book covers much broader ground. If some of the other books discussed here can be said to cover the philosophy of AI, then her book would be best described as being about the *theology* of AI—and we would argue that AI does indeed demand a theology. There is much discussion of animism and the parallels between pre-modern humans granting a degree of reality and consciousness to spirits of certain trees, rocks, places and such. with the seemingly modern idea that inanimate objects we interact with possess a degree of what passes for consciousness. The undercurrent here, along with the discussion on the need for meaning, is that this may take us back to a pre-modern, pre-Enlightenment standpoint for viewing the world. All this is bound up in a fascinating and highly personal account of what is, in effect, a memoir of her feelings when coming into contact with AI. This makes it one of the most enjoyable books on the topic. O'Gieblyn discusses the risk of a Kafkaesque development, with individuals interacting with an inscrutable system that possesses no obvious intent nor meaning. The inability to ask a complex machine-learning model why such a categorization occurred again places the lack of explanation as a central risk at a social level.

In economic and social terms, the emergence of AI can be placed in a long line of technological developments that have changed society, altered the nature of jobs available or even transformed what is meant by a "job." Daron Acemoglu and Simon Johnson have surveyed this history from the point of view of the impact of technological advancements on the distribution of power in society.[6] The work suggests that "a thousand years of history and contemporary evidence make one thing abundantly clear: there is nothing automatic about new technologies bringing widespread prosperity. Whether they do or not is an

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2 But see our discussion of the limits to this in finance in Inigo Fraser Jenkins and Alla Harmsworth, Global Quantitative Strategy, Can there be scientific method in finance?, Bernstein Research, February 2017
3 https://www.nature.com/articles/d41586-022-02083-2
4 https://news.mit.edu/2023/ai-system-can-generate-novel-proteins-structural-design-0420
5 Brockman (2019): Possible Minds: 25 ways of looking at AI, Penguin
6 Acemoglu, Daron and Johnson, Simon (2023)

economic, social, and political choice." Thus, it is not necessarily AI itself but the social and political milieu within which AI evolves that determines any change in the distribution of wealth in society.

The productivity puzzle we alluded to earlier in this note is discussed at length. The huge advances in automation to date have so far failed to show up as an increase in productivity. They point out that total factor productivity in the US since 1980 has been less than 0.7% annualized versus 2.2% from the 1940s through the 1970s.

The harmful impact of AI for societal structures receives a lot of attention in Acemoglu's work, particularly the impact that AI can have on distribution misinformation and extremism. The conclusion the book reaches on this point is that the current path of AI is neither good for democracy nor for the economy, and that these outcomes are mutually reinforcing.

AI raises questions of how we attain knowledge and whether that process is being transformed. In the process, what counts as sufficient support or evidence for a given proposition may change.

Usage of the words "truth" and "evidence" have been in decline for some time (*Displays 6* and *7*). This trend long predates the rise of AI and even the evolution of social media, that other engine that has changed the way many people find out about the world while also fragmenting societal discussion and leading to the emergence of the oxymoronic term "my truth." In this sense, these changes appear to reflect a societal change that was already under way, at least in the English-speaking world, before the latest developments in technology.[7]
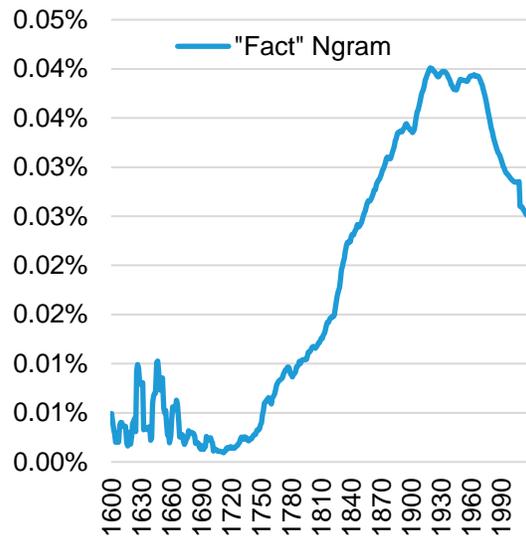
DISPLAY 6: USE OF THE WORD "EVIDENCE" HAS DECLINED
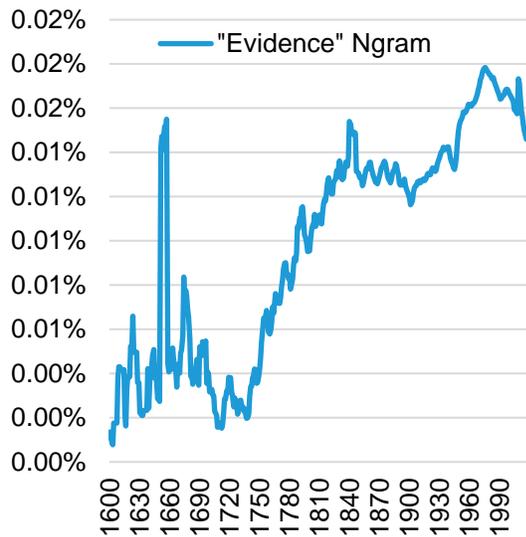
Past performance does not guarantee future results.

Chart shows how usage of the word "evidence" has changed over time. Google Ngram Viewer is a tool that lets users search for the frequency of word/phrase use in Google's library of books published in the period 1600—2019, containing over five million scanned books. As of December 31, 2019
Source: Google Ngram and AB

DISPLAY 7: USE OF THE WORD "FACT" HAS DECLINED

Past performance does not guarantee future results.

Chart shows how usage of the word "fact" has changed over time. Google Ngram Viewer is a tool that lets users search for the frequency of word/phrase use in Google's library of books published in the period 1600—2019, containing over five million scanned books. As of December 31, 2019
Source: Google Ngram and AB

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7 *The Rejection of Facts – Twitter, the Enlightenment, and the Fallacy of Operating Earnings* in Inigo Fraser Jenkins and Alla Harmsworth, The Next 10 Years of Investing, Bernstein Research, May 2019

A key aspect of the ongoing debate about the impact of AI will center on the question of whether this technology changes the meaning of "truth" and the extent to which the enlightenment project of applying reason is in some way changing—or even threatened.

When discussing the role of AI in the evolution of human reason, Franco Berardi invokes the German word "*unheimlich*," which he points out is hard to translate. "Uncanny" is too weak, "creepy" is too childish and "scary" is too dark, so Berardi settles on "sinister." He asserts that reason is no longer the ruler, if it ever was; technology has taken its place. He raises the question of whether this is the end of the Enlightenment or the other way around, as the final realization of the Enlightenment project: submitting reality to the rule of rationality.

In practical terms, any fragmenting in what society agrees on as "truth" raises questions on the future of democracies and the risk around elections in particular. The potential for manipulation through "deep fakes" is likely to be greater with more readily available access to AI. Is AI-driven social media even compatible with democracy? Here is a thought: if there had been AI tools available in the Agora, would the Athenians have invented democracy? Former UK Foreign Secretary William Hague has suggested that AI poses the biggest challenge to the modern state.

Kate Crawford's *Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence* urges us to see AI as an extractive industry, particularly because it exploits cheap labor and data at scale, but also as extraction in a more traditional commodity-based sense of the required energy and the raw minerals for necessary infrastructure. So, AI must be seen as fundamentally *political* and part of the structure of power in contemporary society. The issue of extracting value from using digital infrastructure has been raised before. For example, Christian Fuchs suggests that this can be placed in the context of the Marxist view of labor. When people are contributing to, scrolling through, gawking at or otherwise engaging with social media, they are (almost certainly unwittingly) undertaking labor in a strict Marxist sense. For those of a more vernacular disposition, an alternative way of phrasing this might be the saying: If you are not paying for the product, then you are the product.

Putting this narrative in the context of the history of innovation, Crawford likens society's current approach to framing AI to the "strategic amnesia that commonly accompanies stories of technological progress." Rather than viewing AI as an inscrutable tech-led way to view the world, we are urged instead to view AI as a system that is the product of social and economic structure, with profound material consequences.

Part of the extraction narrative is the view that the tech sector is pervaded by the notion that "everything is data." Context has somehow been relegated to being seemingly unimportant and is expunged. This leads to the view that the tech sector's use of data essentially amounts to a capture of the commons by commercialized interests. Crawford concludes that AI as we see it today is the result of the entanglement of technology, capital and power—the products of our social structure. The book ends with a call for a new politics of refusal, which challenges any narratives of technological inevitability by asking *why* AI should be applied in a given domain.

Aside from AI's sociopolitical aspects, Crawford also touches on some of the epistemological issues raised by it. She refers to this as the "epistemological flattening" of complexity into a "clean signal" for the purposes of prediction. This view echoes the point we made earlier about the demotion of the status of "explanation." The chapter on classification raises the question, "What is a noun?," which can be loaded with social questions of bias.

Education is often suggested as the way out from the risk of mass joblessness due to automation. Quite aside from the stagnation of improvements on that score in recent times in such countries as the US and UK, Martin Ford's *Rise of the Robots*, suggests clear limits to what can be achieved through education. He suggests that these limitations are analogous to believing that "in the wake of the mechanization of agriculture, the majority of displaced farm workers would be able to find jobs driving tractors." This leads Ford to suggest that, in the face of AI, there is a strong economic case for universal basic income (UBI).

This book opines on the productivity puzzle, too, suggesting that much of this apparent puzzle is due to suppressed growth, and he lays the blame on inequality. Ford is far from alone in railing against the excessive quantification of economics as a field. As a consequence, it is very poor at modeling structural regime changes outside the experience of past data.[8]

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8 We suggest a similar issue arises in investment as well. See Inigo Fraser Jenkins and Alla Harmsworth, Portfolio Strategy: Why I am no longer a quant, Bernstein Research, October 2020

Crawford, Acemoglu and Kissinger all point to an interpretation of AI's impact as inextricable from politics. Amid all of AI's hype and seeming inevitability, the common theme in these works is that AI is a function of social structures that can be chosen. We would agree. This notion is important in weighing the conflicting structural consequences of increased AI adoption. On one hand, there is the positive narrative of higher growth as a consequence of a potential increase in productivity. Set against that is the risk to growth of unemployment, and an even greater potential for second-order effects on society from the narrowness of net wealth creation and risks to social structures. This tension underlies much of the macro debate on AI that runs through this note; we'll return to it later when we consider market implications.

The Future of Employment, Retirement and the Case for UBI

In the contemporary public debate about job automation, the principal fear is of individuals being unwillingly dismissed from their jobs as they are automated, and unable to secure new employment at the same wage, given their available skill sets. Of course, there is another side to this debate. In John Maynard Keynes's *Economic Possibilities for Our Grandchildren*, published in 1930, the author famously predicted that future generations would only need to work a very curtailed week, because output would rise with automation. Nearly a century later, that prediction has been proven spectacularly incorrect. People do not wish to live today at the same real standard of living that was the norm in 1930. That drive requires a growth in real income and hence continued employment. There is also an important distributional point here: aggregate output can grow with automation, but if its benefits accrue to a small minority, then those less well-off have little choice but to work anyway.

However, the idea that work might be a social choice features in contemporary post-capitalist literature. The common sequence offered by some on the political left is that automation leads to structural unemployment, which in turn leads to a demand for UBI. Srnicek and Williams upend this logical sequence. They start by demanding automation, which in turn leads to a voluntary reduction in the need to work in conjunction with the development of UBI. This sequence, of course, requires that advances in technology and AI are directed in socially useful ways, as opposed to the profit-maximizing route taken today, and it also makes massive assumptions about government's ability to direct such a system.

Whether via enforced structural unemployment or some other mechanism, discussion on the labor-market impact of AI leads, with a certain inevitability, to a discussion of UBI. Let's be clear: there is no prospect of this in the near term—advanced economies are at or near full employment, and high debt levels combined with the recent rise in the cost of debt would make it unthinkable. Moreover, AI's near-term impact on net job destruction/creation is very unclear.

But what about longer term?

The debate about the automation of jobs and the potential for UBI will rage for years. There are strong arguments on both sides, but ultimately our job is to take a view. In this vein, we see UBI as indeed a serious prospect for advanced economies in the longer term. Crucially, we have the example of the pandemic, with the US government handing out cash to individuals while European governments enacted furlough programs. Before the pandemic, one had to cite very limited test cases—Finland, for example—but now the genie is out of the bottle.

Acemoglu dismisses UBI as a "fundamentally defeatist view of the future," because it accepts that a large part of the population cannot contribute to society. He suggests that UBI is not needed because, as with previous technological advances, it is possible to change who controls technology and what it is used for. Thus, AI could be re-tasked to be socially useful instead of profit-maximizing, focusing on the kind of automation that makes workers more productive rather than replacing them.

We won't know for years whether AI fits into the long line of technological advances since the Industrial Revolution, whether it does not destroy jobs on a net basis, or whether it is genuinely new. But this tension between increasing growth in aggregate and a potentially more insidious change in cross-sectional distribution is one of the key economic consequences of AI.

The last 20 years of tech development has already contributed to wealth inequality because of skewed stock-market ownership. Another leg higher in the value of listed tech companies stemming from AI benefits would perpetuate that inequality. To the extent that new AI developments are progressively more likely to emerge from private equity–backed companies, this issue would be further magnified, because the beneficiaries are likely to be an even narrower group. Of course, things are never as black and white as that: to the extent that pension plans, especially in the US, have invested in private equity, they can socialize the benefit. The difficulty comes if the expansion in profits from AI come from either eliminating jobs or exploiting social data that is arguably part of the Commons. More on this below.

Job destruction is often the immediate worry expressed when AI is discussed in client meetings. AI evangelists would rightly point out the long history of technological developments displacing jobs or even eliminating whole categories of jobs—from mechanical looms to cars, electronic calculating machines and the internet. The famous injunction issued by Elizabeth I, refusing to grant a patent for a knitting machine because it would put hand knitters out of work,[9] shows how long these fears have persisted but with no long-term impact on employment.

Despite the long history of worries about automation destroying jobs, there has not been a trend of increasing unemployment over the past century. David H. Autor, in a paper whose title is delightfully to the point, "*Why Are There Still So Many Jobs?,*" makes the positive argument that automation complements labor to raise overall growth, and ultimately, demand for labor. Yes, automation does replace some jobs, but higher output from the complementary effects of automation and labor creates more demand for jobs. At least, that is the pattern so far and why, throughout all the automation of the past century, there has been no trend of increasing unemployment.

Examples are legion. Autor cites the specific case of bank tellers. The invention of the automated teller machine (ATM) did not, immediately at least, wipe out this job category. In fact, the number of US bank tellers rose over the 30 years following the ATM's invention. Two elements drove this trend: the lower cost of running a branch meant more branches opened, and bank tellers were freed from some of the basic cash-handling activity to perform other tasks. However, Autor acknowledges that "rapid automation may create distributional challenges that invite a broad policy response." The ultimate role of politics in determining the impact of technological advances is a threat that runs through our note. The open question is whether the scale, scope and speed of automation offered by AI is different from previous technological developments. One that raises questions of whether education or retraining can, especially over time scales that can respond to technological advances that are faster than a working career, compensate for the shift in working patterns? Autor acknowledges these fears, but rightly concludes that "if human labor is indeed rendered superfluous by automation, then our chief economic problem will be one of distribution, not of scarcity." It is within the cross-sectional impact of AI that the biggest immediate societal challenges will likely appear.

A final point we would make in this section is that we are struck that much of the writing on this topic, from the financial point of view at least, seems to miss the inherent endogeneity of all this. The purpose of most investing in the first place is ultimately to meet some objective "liability", if you will, set in the real economy. The main liability is to fund retirement. What does the social impact of AI mean for the concept of retirement (and hence the retirement saving industry)? A discussion of the impact of AI on employment and UBI would not be complete without a discussion of what happens to retirement.

Retirement as a social norm became a widespread phenomenon in the mid-20th century. It is well understood that demographics—a relatively large number of young people per retiree and shorter life expectancy—made that possible. It is sometimes missed that retirement was also enabled by a macro set-up that made funding it relatively easy through rising asset markets and given an extra boost in real terms by declining inflation in recent decades. Before we add AI into the thematic mix, the set-up today looks more challenging: the combination of lower nominal asset-class returns and higher inflation implies a need to save more for a given retirement outcome. This challenge is made harder still by longer life expectancy, lower age-adjusted wealth levels for younger cohorts, and fewer workers per retiree.

All this points to a reckoning in how retirement is perceived and funded. The possible solutions are to save more, work longer or allow greater immigration, all of which come with political costs. Such a debate is probably familiar enough, but what does a greater role for AI do to it? Anything that lifts growth rates and potentially lowers inflation would be expected to help retirement saving. However, the model of needing to work longer into one's 70s may be harder to achieve in an environment when jobs are automated. Likewise, it may be harder for workers to save more in any rebalancing of labor versus corporate wage bargaining power that favors corporations. Finally, proposals for a form of UBI raise profound questions of what retirement would even mean. Well-off people would presumably still want to invest to achieve a higher standard of living later in life. But for someone relying on a UBI payment, retirement would likely be irrelevant. Does retirement have a future in a world of AI?

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9 The Queen's response to the patent application was, "*Thou aimest high, Master Lee. Consider thou what the invention could do to my poor subjects. It would assuredly bring to them ruin by depriving them of employment, thus making them beggars*."

Cementing the Power of Corporates vs. Governments and Labor?

The past 40 years have seen an erosion of government power versus corporate power. Deglobalization and other internal political forces in advanced economies had seemed poised to at least somewhat reverse this imbalance. The question that comes up frequently in meetings is: Could AI plausibly make corporations even more powerful again, extending a period in which the profit share of GDP remains unusually high? A reason that such an eventuality is possible is that the regulatory response to AI appears very lagged. Moreover, decisions on what developments in AI take place, and what the goals of AI development even should be, are made in the corporate sector.

Corporations have been one of the biggest winners from globalization, accompanied by policy decisions that have given companies a high degree of freedom to optimize their labor costs. This trend has led to a decline in the wage share of revenue, the effective corporate tax rate and inventory ratios. The bull case of AI (from a shareholder perspective at least) is that it allows another leg higher in what is already a record profit share of GDP.

Leaving aside short-term variation over the business cycle, there has been a clear regime change in the profit share of GDP in the US since the mid-80s, with share jumping from 7% of GDP to 11%–12% (*Display 8*). Our base case is that profit share will be eroded by deglobalization, a demographic dearth of labor, the "S" in ESG and the need to pay for the negative externalities of environmental impact. This would be expected to increase inventories, effective tax rates and wages. The open question is whether AI negates this, entrenches corporate power and maintains a profit share above 10%.

DISPLAY 8: WE EXPECT PROFIT SHARE TO DECLINE. COULD AI NEGATE THIS?
US PROFIT SHARE OF GDP
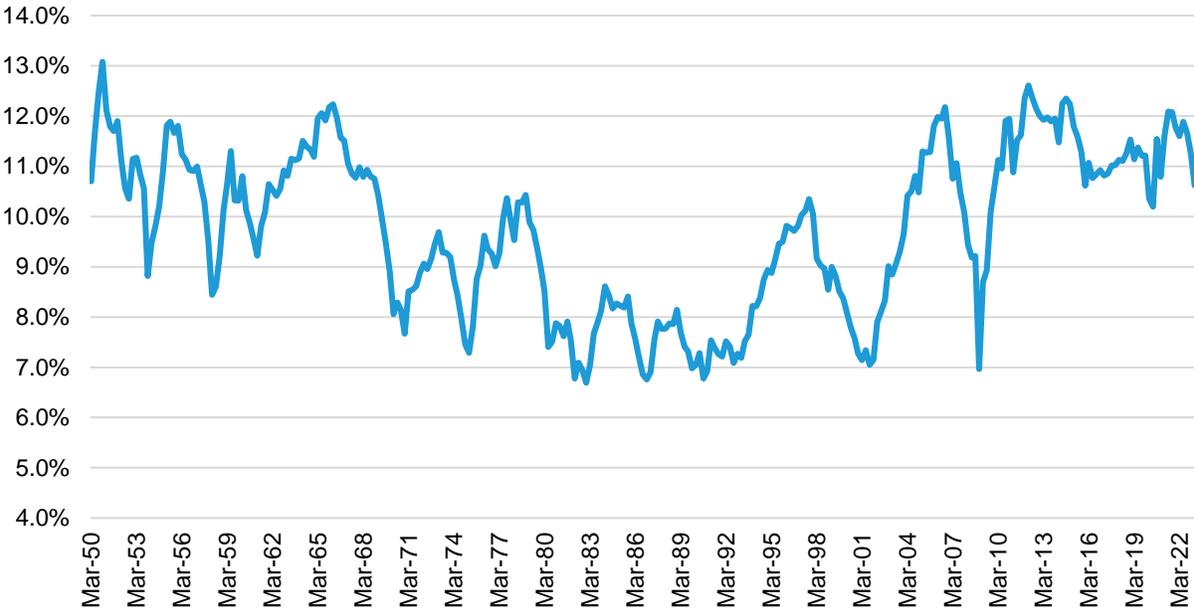
Historical analysis and current estimates do not guarantee future results.
As of March 31, 2023
Source: US National Economic Accounts, Thomson Reuters Datastream and AB

The potential impact on profit share is an example of an area where the technological development of AI *per se* does not determine the outcome. Instead, this is more of a reflection of policy choices. For example, the way that AI may entrench corporate power is primarily an issue in the West, where corporations already have a high degree of power. In China, AI seems unlikely to have the same pro-corporate role.

Why should CEOs of private companies get to decide what AI developments take place? Acemoglu's view, for example, suggests that measures need to be taken to redirect technology, including unionization, subsidies for socially useful tech and tax reform so as not to favor automation. He also suggests that governments must be more actively involved in directing technological development and weighing in on questions of data ownership.

The other power dynamic that AI could change is the relative power of labor versus capital. The stage seemed set for something of a reversal of the dynamic prevailing over the past 30 years, with a decline in the number of effective workers (from a combination of deglobalization and demographic change) and the growing emphasis on the "S" in ESG, both implying a higher path of wages. AI could forestall this if it leads to more job destruction.

Worker power matters in determining this balance, and it is striking that the jobs most open to disruption by AI tend to be significantly less unionized than equivalent jobs that were disrupted by automation over the past 50 years. This gap is perhaps most apparent for financial, professional and business services (*Display 9*). This is a change from the last 30 years, during which jobs that were vulnerable due to technology and globalization were, in many cases, more unionized.

DISPLAY 9: JOBS MOST AT RISK OF AI DISRUPTION TEND TO BE NON-UNIONIZED
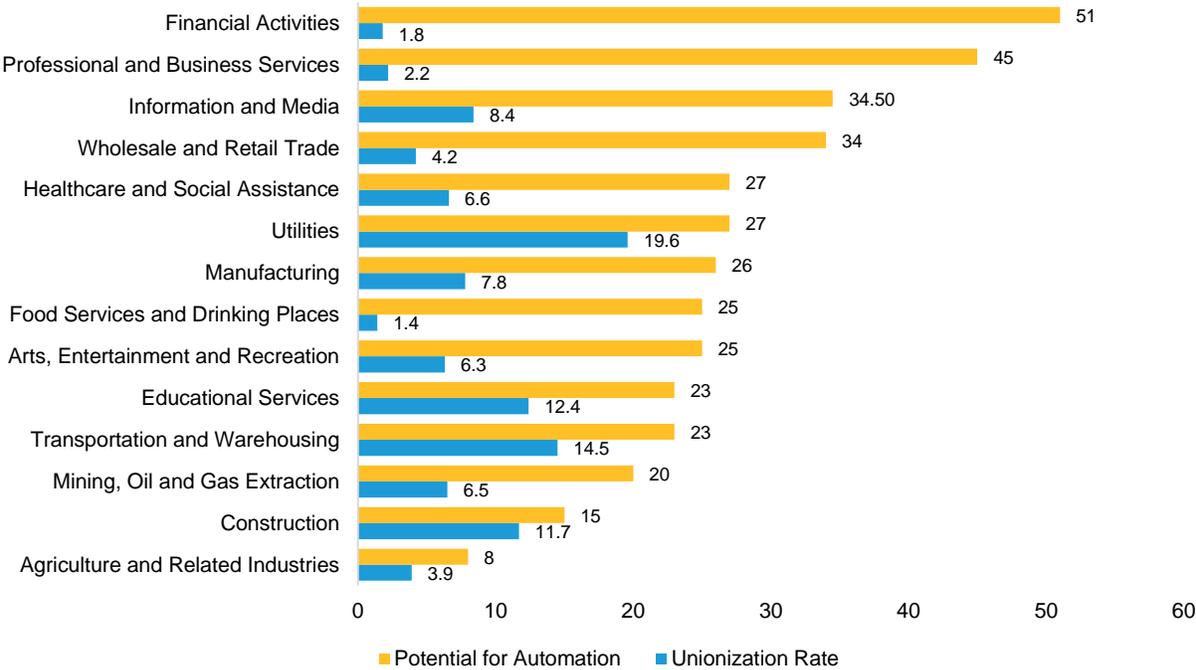
Historical analysis and current estimates do not guarantee future results.

As of June 29, 2023

Source: Accenture Research analysis of Occupational Information Network, US Bureau of Labor Statistics, US Department of Labor and AB

We have contrasted the power of corporations with both governments and labor through the lens of AI. Arguably, another dimension could be added to this: the relative positioning of corporations versus open source. There is not the same kind of long history for open-source movements that enables us to analyze their relative power *vis-à-vis* corporates through periods of technological change versus labor or governments. Nathaniel Tkacz[10] has pointed out that the emergence of "openness" within a society already supposedly open confirms the closures that exist in society; in the case of this discussion, the context is corporations. In the same essay, Tkacz suggests that the components of open-source movements defy political description. For the moment, corporations appear to be in the driver's seat of AI development, but open-source movements present, perhaps, a plausible competing path for development in this space.

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10 Tkacz, Nathaniel (2012) *From open source to open government: A critique of open politics. Ephemera: Theory and Politics in Organization*, Vol.12 (No.4). pp. 386-405. Available at https://wrap.warwick.ac.uk/53295/1/WRAP_Tkacz_12-4tkacz.pdf

Concentration of Returns: Active, Passive and Risk

Does AI cement the concentration of returns in markets? A defining aspect of the frenzy of AI interest this year is the degree to which returns have been concentrated in a small number of stocks. Is this an inherent feature of AI, and one that is entrenched?

In fact, it is normal for equity returns to be highly skewed in the cross section; historically, a small number of stocks deliver high returns and the majority do not.[11] What was unusual about 2022 was the degree to which the leaders were the largest stocks, not the existence of a return skew, per se. The question this year is whether this pattern marks a trend, with the largest companies able to invest on a scale that smaller competitors cannot match. One way of approaching this question is to ask: Are periods of innovation in technology inherently periods of greater market concentration?

We investigated past periods of concentration but could find no evidence that they overlap with periods of faster growth. If anything, higher-growth periods are generally times of less concentration. This would be consistent with the idea that if overall growth is strong, the drivers of stock returns are the (more heterogenous) views on individual cash flows, as opposed to slower growth periods when more stocks will likely be similarly affected by a common shock to discount rates via the risk premium.

Could AI entrench concentration further, though? Babina, et al (2022)[12] investigated the impact of AI technologies on industry concentration and the growth of superstar firms. Using a novel dataset that allows the tracking of AI-skilled human capital investments, they show that the positive effects of AI-related spending are concentrated among the ex ante largest firms, enabling them to grow even larger, which leads to greater industry concentration. Interestingly, the authors also show that this increase in concentration is not accompanied by increased markups or productivity. Instead, AI investments allow the largest firms to expand into new product and geographic markets, leaving long-term expansion open to being curtailed by regulation.

However, we think it's important to note a significant caveat. The study period covers only 2010 to 2018, a unique time with an unprecedented rise in the power and profitability of large tech firms as well as very favorable macroeconomic conditions. This period also occurred before major breakthroughs in large language models, such as ChatGPT, were announced and put into widespread use. Thus, with a more uncertain macroeconomic outlook going forward and very rapid developments in the field of AI, results from the previous decade might not be as applicable going forward.

The bottom line is that return concentration is normal, and we would expect opportunities within AI to act as a force creating a small set of winners for a time, as other technological advances have done before. What is unusual is that the concentration of returns is among the largest companies. That seems unlikely to last in the long term, given the combination of relative valuation and regulatory scrutiny.

What Does All This Mean for Investment?

Economics (and strategic asset allocation) always comes down to politics in the end. We would argue that an innovation such as AI, as with other technological developments, does not predetermine a given economic outcome. That outcome rests more with social and political choices made with respect to AI.

The key implications of AI for macro variables from all this as we see them are:

- AI could offset declining aggregate growth from other macro-mega forces, such as a declining number of working-age people in advanced economies and China as well as deglobalization.

- Is AI deflationary? Specifically, does it have the potential to offset inflationary forces from what would otherwise be a likely higher-wage path and the need to fund the energy transition?

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11 See our note discussing the degree to which equity returns are skewed increase with time horizon. Inigo Fraser Jenkins and Alla Harmsworth, Portfolio Strategy: Entrenching an odd market structure - what it means for market direction, factors and active managers, Bernstein Research, May 2020

12 Babina, Tania and Fedyk, Anastassia and He, Alex Xi and Hodson, James. A*rtificial Intelligence, Firm Growth, and Product Innovation*. Journal of Financial Economics (JFE), Forthcoming, 2022. Available at SSRN: https://ssrn.com/abstract=3651052

- After decades in which corporations had accrued power versus labor and governments, that trend looked as if it might ebb. But is AI a route to further entrench the power of corporations, extending a period of higher profit share of GDP?

- There is a potential disconnect in forces acting on the price of risk assets. Aggregate growth could be boosted, but a wider dispersion in the cross-sectional distribution of growth also implies greater risk of social backlash and hence higher risk premia.

- There could be a large increase in risk around the outcomes of points of geopolitical tension and elections.

One of the big strategic questions is whether the US growth large-cap equity leadership of recent years can continue. In our recent note, A Triumvirate of Macro Mega-forces, we pointed out that the US was already more immune to the negative influences of deglobalization, demographic change and climate than other markets. The main constraint on the continued US outperformance over strategic time horizons is valuation, though over the past 20 years, relative earnings growth—not valuation—has determined long-term relative returns. Mean reversion is, however, one of the most powerful forces in investing, at least when applied over long time horizons. So it seems right to assume as a base case that there can be something of a catch-up for non-US markets over long horizons (though with a lower outperformance than was generally assumed before). However, in the case of an adverse impact from those mega-forces, then the US seems likely to outperform.

How does AI change this situation? If AI can indeed lead to a material change in growth rates, the US would be likely to benefit more than other developed markets, so a belief in the ability to AI to boost growth would possibly delay the mean reversion of the US versus non-US markets. A corollary of this is that a boost from AI will also likely benefit corporations at the expense of other stakeholders and be better for the largest corporations to boot.

In *Display 10*, we show current relative valuations for three linked trades: US versus EAFE, large cap versus small cap, and tech versus the broad market, based on current earnings and out to FY3. In all cases, these trades are above their average multiples but a long way below the level of 1999 to 2000. So despite the dominance of mega-cap growth names in recent years and the AI-led resurgence of growth in 2023, the valuation is far from previous bubble levels.

DISPLAY 10: CURRENT RELATIVE VALUATIONS VS. PRIOR EPISODES

S&P 500 vs. EAFE	PE FY0	PE FY1	PE FY2	PE FY3
Current	1.55	1.56	1.49	1.43
December 1999	0.74	0.89	0.94	0.97
Average since 1990	0.96	1.01	1.03	1.07
S&P 500 vs. US Small Cap	**PE FY0**	**PE FY1**	**PE FY2**	**PE FY3**
Current	0.92	0.98	1.09	1.15
December 1999	1.19	1.06	1.21	1.21
Average since 1990	0.67	0.77	0.92	0.96
US Tech vs. S&P 500	**PE FY0**	**PE FY1**	**PE FY2**	**PE FY3**
Current	1.47	1.49	1.45	1.40
December 1999	2.36	2.07	1.97	1.82
Average since 1990	1.39	1.36	1.31	1.27

Past performance does not guarantee future results.
Technology sector average since 1995
As of August 28, 2023
Source: FactSet, Thomson Reuters I/B/E/S and AB

However, when one looks at just the top 10 stocks by market cap (*Display 11*), the subject of all the hype over the last year, valuations seem much more extreme. They trade close to a record relative multiple—twice the forward earnings of the rest of the market. Valuation is never a signal for tactical realignment, so it tells us nothing about the short term. Thankfully, the focus of this note is strategic rather than tactical, and over longer horizons it is highly unlikely that this valuation spread is sustainable. We do not think that AI developments can maintain this valuation spread on a multiple-year horizon.

DISPLAY 11: THE LARGEST 10 STOCKS IN THE US TRADE AT A RECORD MULTIPLE RELATIVE TO THE REST OF THE MARKET

12-MONTH FORWARD P/E OF US LARGEST 1,500 STOCKS
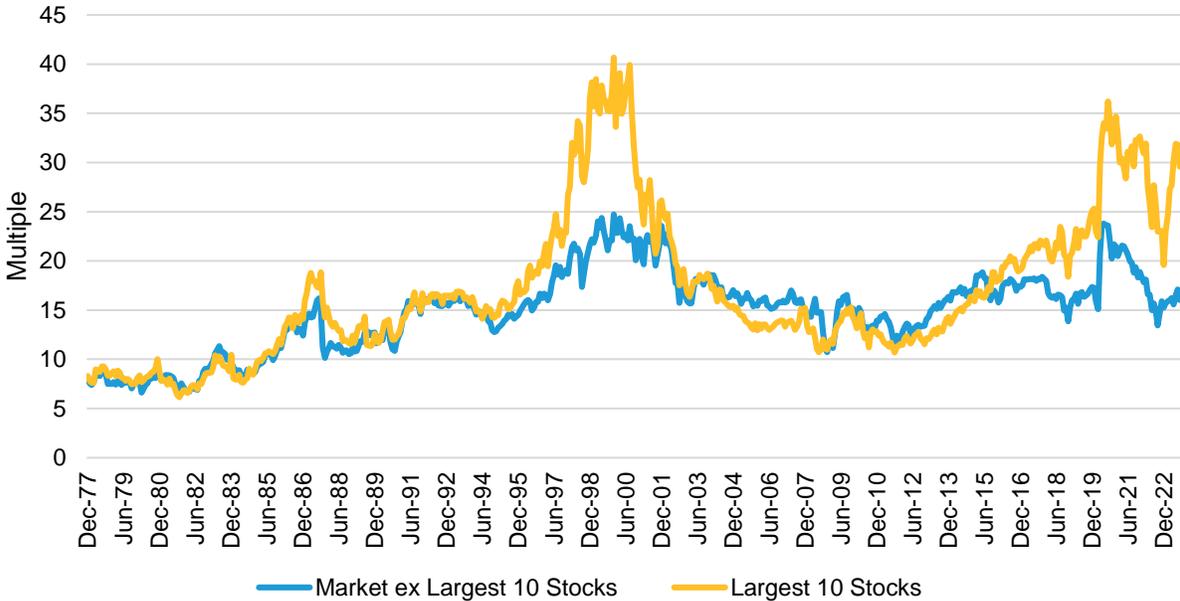
Past performance does not guarantee future results.
As of August 31, 2023
Source: Bernstein Research, FactSet, and AB

Moreover, the persistence of growth has abated somewhat. *Display 12* shows the probability that highly profitable stocks are still high-profitability stocks from one to five years in the future. There had been an upward trajectory in the US that set it apart from other regions and implied that there was greater longevity in corporate profitability. While the absolute level of this persistence is still greater in the US than in other regions, its upward trajectory seems to have come to an end. A 70% probability of a top-quintile stock based on ROE still being a top-quintile stock in five years is still a higher number, and helps justify a high multiple compared with history. However, this now lacks the ever-higher multiple of the pre-pandemic years.

DISPLAY 12: THE UPWARD TRAJECTORY IN THE PERSISTENCE OF CORPORATE PROFITABILITY APPEARS TO HAVE ABATED: PROBABILITY OF A HIGHLY PROFITABLE STOCK STILL BEING HIGHLY PROFITABLE IN *N* YEARS' TIME
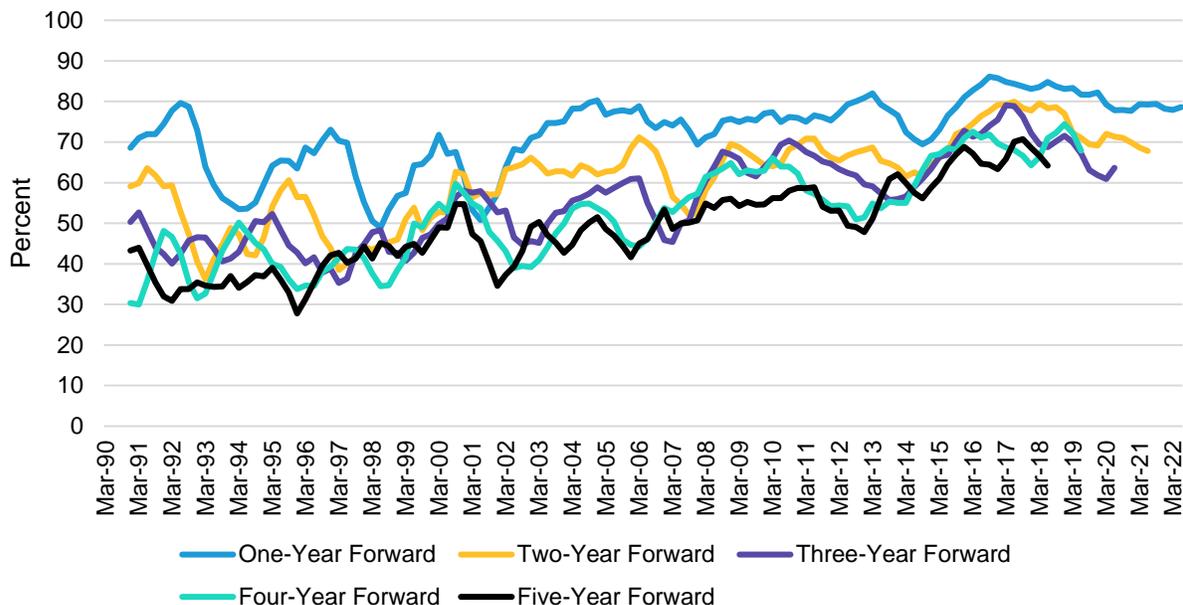
Historical analysis and current estimates do not guarantee future results.

In each quarter since 1990, we split the stocks in the MSCI USA Index into groups by return on equity (ROE) deciles (within sectors) and calculated the percentage of stocks in the high ROE decile at a specific point in time in the highest two deciles over the next one to five years. A four-quarter smoothing is applied to the quarterly percentages.
Data from January 1, 1990 through June 30, 2022.
Source: FactSet, MSCI and AB

One of the themes in this note has been the juxtaposition of the potential higher aggregate growth with a more troubling implication for the cross-sectional distribution of its benefits. This juxtaposition is probably the key markets-related conclusion of this note, suggesting a provisional basis for considering the strategic-asset-allocation consequences of AI.

There is an asymmetry in how markets price the attributes of growth and fundamental uncertainty. Markets are likely to quickly price in the benefits of upward revisions in both the aggregate growth rate and the implied high profit share of GDP. Thus, there is a plausible narrative of a higher path of corporate earnings than would have been the case without widespread deployment of AI. By contrast, we would argue that markets do a poor job of pricing in second-order risks posed by, first, a change in the cross-section of wealth, and second, greater political or geopolitical risk. Second-order risks are inherently harder to assess, because the political implications of social dislocation, election risk and the potential geopolitical risks highlighted by Kissinger will all be learned about slowly over time. Historically, the equity risk premium tends to rapidly adjust upward during instability rather than gradually pricing in that change via a new equilibrium risk premium ahead of time. *Display 13* shows the US equity risk premium, defined as 10-year average inflation-adjusted earnings yield less the real yield on government bonds. We plot this against the Geopolitical Risk Index, a measure of adverse geopolitical events and associated risks, computed by calculating the share of newspaper articles covering geopolitical tensions.

DISPLAY 13: MARKETS DO A RELATIVELY POOR JOB OF EX ANTE ADJUSTING TO HEIGHTENED POLITICAL RISK

Geopolitical Risk Index (Historical) (LHS) —— US 10-Year Equity Risk Premium
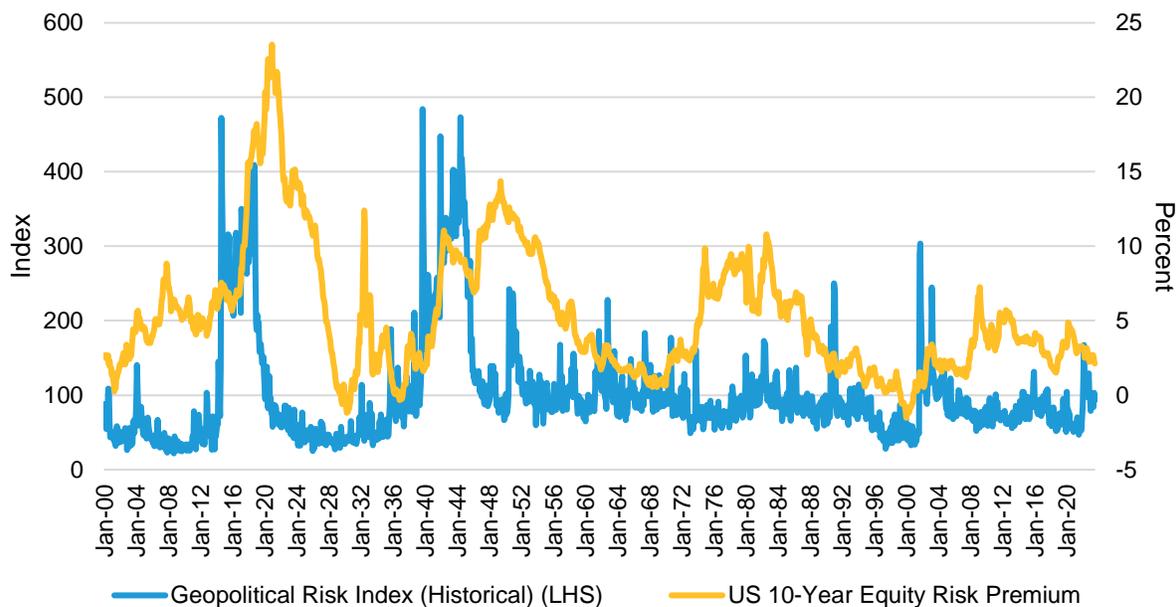
Past performance does not guarantee future results.

As of June 15, 2023

Source: Dario Caldara and Iacoviello (2022), "Measuring Geopolitical Risk," American Economic Review, April, 112(4), pp.1194-1225, downloaded from https://www.matteoiacoviello.com/gpr.htm, Robert Shiller's database, Thomson Reuters Datastream and AB

How can strategic asset allocation adjust to the potential for somewhat higher real growth (both earnings and GDP) but also higher long-term uncertainty?

Higher equity exposure than in a non-AI world: The higher potential growth rate and profit share of GDP suggest a higher allocation to equities than would be the case if AI were not deployed. So a case for equities and exposure to growth in general is probably the key directional implication.

Plan for a higher equilibrium inflation level: AI introduces plausibly deflationary forces, but we would maintain our view that the equilibrium level of inflation will remain above the pre-pandemic level. This stems from the other large macro forces at work that point to higher inflation: deglobalization, a shrinking number of workers, paying for the energy transition and social concerns about wage disparity that implies a higher path of wages.

Expect a higher risk level across portfolios: The message from our research has, for some years, been that investors will just have to accept a higher level of risk across the board in portfolios. The potential for greater political and geopolitical risk because of AI adds another reason to believe this. How could one diversify? The historic knee-jerk reaction would be to buy bonds, especially noting today's starting yields. While that may well have attractive elements from a near-term perspective, we are not sure that the case holds strategically, at least for sovereign bonds. The extra fundamental uncertainties AI introduces are at the government/inter-government level. There are upside and downside risks to AI, but the downside risks are a challenge to the modern nation-state. Thus, trying to hedge the greater long-term uncertainties of AI with government securities might not make sense. Moreover, the other negative strategic issues for government bonds still stand, notably the prospect for more supply than demand,[13] the risk of debt monetization and the nonexistence of risk-free assets in a new investment regime.[14]

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13 Four Strategic Allocation Issues for Asset Owners in 2023

14 Inigo Fraser Jenkins and Alla Harmsworth, Global Quantitative Strategy: The end of Pax Americana and what it means for the market, Bernstein Research, January 2019

Pursue diversifying return streams: This landscape instead points to using diversifying return streams, such as private/real assets, being careful to note that the lack of marking to market is fake diversification. What is important here is buying assets that are hard to source in public markets. Also, given that the big extra uncertainties from AI lie at the governmental level and are somewhat existential, this naturally raises the case for gold as the appropriate hedge for equity risk. However, these risks are far off and hard to quantify, so any change in gold allocation in a strategic asset allocation today would be small.

Prepare for further shifts in the active-passive boundary: The other type of investment implications from the rise of AI fall under what we would refer to as the methodology of forming investment decisions. Within portfolios, the development of AI likely further shifts the active-passive boundary. We have long argued that this boundary is dynamic, not set in stone. If so-called smart-beta strategies were the passivization of what had previously been regarded as active strategies, then one can expect a further step in that direction.

Re-focus analysts' time usage…and time horizons: Likewise, we suspect that AI will lead to an evolution in the usage of analysts' time. We have made the point in prior research[15] that it will probably shift time spent away from data collection and manipulation and toward more fundamental—and potentially more important—tasks. We also suggest that AI's presence will impact the time horizon over which analysts express their views. It seems likely that AI approaches can take on a greater share of forecasting next quarter's earnings, freeing analysts up for more fruitful activity at longer time scales.

One way of thinking about this is as a potentially greater "passivization" of short-term forecasting versus more active decisions taken over longer horizons. One could think of three stages of the passivization of investment decisions. The first was the rise of the index fund to gain exposure to market beta. The second was the post-global-financial-crisis use of quant strategies to passivize simple factor exposure (smart beta—a ghastly term, but we use it as it is ubiquitous). The third stage might be the passivization of the incorporation of a host of short-term signals that were previously thought of as requiring an active decision, such as interpreting daily news flow. A truly active strategy might come to be a strategy over and above that which can be achieved from such signals.

Laying out strategic investment implications for AI is incredibly hard at this stage. Thus, while the topic comes up in the majority of meetings, it has not yet led to a reallocation of capital at the asset-class level, something we think will happen in coming years.

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15 Inigo Fraser Jenkins and Alla Harmsworth, Global Quantitative Strategy: Why company models need to move out of Excel and into Python, Bernstein Research, October 2018

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