

Financial Times 번역요약본 ('25. 5/27)

1. The AI revolution changing how we predict the weather ('25. 5/19)

- 컴퓨터를 활용한 실시간 날씨 예보의 시대는 1965년 영국 기상청 (Met Office)이 '코멧(Comet)'이라는 거대한 (방 크기)의 컴퓨터를 도입하면서 시작되었고, 60년이 지난 지금, 영국의 국가 기상 예보 기관은 인공지능이 중심이 된 또 다른 기술 혁명의 한가운데 있음. AI는 구름, 강수, 기온 등 끊임없이 변화하는 기상 패턴 예보를 강화하고 있으며, 보다 정확한 예보와 기상 재해 정보는 공공 안전과 건강을 향상시키고 전 세계 경제의 효율성도 제고할 수 있음. 케임브리지 대학 연구팀에 따르면, AI는 이미 초단기 예보인 '나우캐스팅 (nowcasting)'을 변화시키고 있으며, 이제는 3-15일의 중기 예보에 이어 2주에서 2개월까지의 '준계절예보 (sub-seasonal forecasting)' 영역으로 확장되고 있고, 이러한 기회는 구글 딥마인드, 엔비디아, 마이크로소프트와 여러 스타트업 등 다양한 기술 기업들의 투자를 유치하고 있음. 전통적인 기상 예보 모델은 수십 개의 시나리오로 다양한 가능성을 제시하지만, 연산 자원이 한정적인 반면, AI는 수천 개의 시나리오를 동시에 예측해 극한 기상 사태를 조기에 감지할 수 있음. 예보 정확도가 높아지면 재생에너지 기반 전력망 운영이나 천연가스 선물 거래 등 금융 및 투자 분야에도 활용할 수 있음.

2. The new market for AI data ('25. 5/19) Kim Posnet (골드만삭스 글로벌 투자은행 공동 대표)

- 데이터는 인공지능 혁명의 토대이자, 동시에 인공지능은 데이터 시장 자체를 혁신하고 있음. AI 시스템은 일반적으로 세 가지 주요 요소 (1. 전력 - 데이터센터를 구동하는 전기, 2. 연산력 - 초고속 연산을 수행하는 반도체 칩, 3. 데이터 - AI 모델을 학습시키는 핵심

자원)로 구성된다고 말하는데, 이 중에서 '데이터'는 가장 덜 논의되는 요소임. 왜냐하면 데이터센터나 반도체 칩은 눈에 보이고 만질 수 있는 물리적 실체지만, 데이터는 그렇지 않기 때문이고, 하지만 데이터를 확보하는 일은 AI 생태계 확장에 있어 핵심 요소임. 일부 분석에 따르면, 개발자들이 더 큰 모델을 학습시키기 위해 인터넷 전체를 긁어모은 공개 데이터를 이미 거의 소진한 상태이며 세상은 이미 '자연 데이터 (organic data)'를 고갈시키고 있음. AI 모델은 대형 데이터로 사전 학습 (pre-training)된 후에도 특정 질문에 답하거나 문제를 해결하기 위해 추가 연산 (test-time compute)을 수행해야 하며, 이때 적합한 유형의 데이터가 부족한 경우가 많음. 예를 들어 인간이 복잡한 문제를 풀 때 사고 과정을 단계별로 보여주는 데이터가 부족하며, 이런 점에서 구조화되어 있고 논리적인 데이터를 보유한 기업들은 새로운 기회를 가질 수 있음. 최근의 시장을 보면, 데이터 판매 시장이 부상하고 있고, 지금까지 분석이나 활용이 어려웠던 날씨 데이터, 양자역학 데이터, 바이러스 돌연변이 정보 등도 AI의 막대한 연산력 덕분에 새로운 가치를 가지게 되었음.

3. Are female experts more credible? ('25. 5/20)

- 미국의 남성 또는 여성 고위 경제학자들이 동일한 주장을 펼치는 실험이 있다고 상상할 때, 어느 쪽이 더 설득력이 있을까? 첫 번째 예상은 둘다 아니다 일 것이고 그렇지 않다면 남성일거라고 생각했을 것. 사람들은 여전히 남성과 여성 사이에 '권위의 격차 (authority gap)'을 느끼는 경우가 많다는 연구도 있음. 하지만 경제학자들이 미국 내 3천명의 일반인을 대상으로 최근 시행한 실험 결과에 따르면, 사람들은 여성 경제학자의 의견이 남성보다 20% 더 큰 영향력을 발휘했다고 응답함. 같은 실험을 진행하면서 전문가의 직함이나 소속 대학명을 제거하고 물었을 때 (경제학자라는 사실 외에는 아무것도 모르는 상태), 남성과 여성의 설득력 차이는 사라졌음. 연구자들의 해석은, 사람들은 남성 중심의 분야에서 여성들이 고위직에 올랐다면, 더 뛰어난 자질을 지녔다고 간주한다는 것. 대중이 여성이 더 높

은 기준을 통과했을 것이라고 생각하는 것이 정당한가 여부는 논쟁의 여지가 있지만, 중요한 사실은, 많은 사람들이 그렇게 ‘가정’하고 있다는 점. 따라서 당신이 남성 중심 분야의 고위 여성 전문가로서 대중 앞에 설 상황이라면, ‘내 말을 사람들이 과소평가하지 않을까’ 하는 내면의 목소리를 잠재워도 되고, 이는 청중은 이렇게 생각하고 있을 수도 있기 때문임. ‘이 여성이 이 자리까지 올랐다면 정말 대단한 사람일 거야. 무슨 말을 하는지 들어봐야겠어.’

4. Autonomous cars with ‘social sensitivity’ cut threat to road users, study finds (‘25. 5/20)

- 자율주행차가 위험에 대해 인간처럼 반응하도록 훈련되면, 교통사고 발생 시 부상자 수를 줄일 수 있다는 연구 결과가 나왔고, 이는 운전자 없는 차량/자율주행차량 (AV, autonomous vehicle)의 안전성 향상을 위한 새로운 가능성을 보여줌. 특히 자전거 이용자, 보행자, 오토바이 운전자 등 취약 계층이 가장 큰 보호 효과를 본 것으로 나타났고, 이들은 자율주행차가 다중 위험 요소의 집단적 영향을 ‘사회적 민감성’으로 판단할 때 더 안전해졌음. 자율주행차는 각종 센서와 자동화 소프트웨어를 통해 인간의 개입 없이 스스로 주행하지만, 현실의 복잡한 상황, 예를 들어 피할 수 없는 충돌 시 무엇과 부딪힐지를 선택해야 하는 딜레마에 대응하도록 AV를 훈련시키는 일은 여전히 과제로 남아 있음. 이 연구를 이끈 홍콩과학기술대의 교수는 ‘우리는 AV가 인간처럼 사회적 우려 (social concern)와 인지 기반 판단을 통해 윤리적 의사결정에서 사회적 민감성 (social sensitivity)을 발휘하도록 하였고, 이런 능력은 AV가 실제 도로 환경에 더 잘 통합되도록 도와준다’고 말함. ‘사회적 민감성’이란, 인간 운전자처럼 도로 이용자별 취약성을 인식하고, 사고 발생 시 누가 더 큰 피해를 입을지를 판단하는 능력을 말하며, 연구팀은 신경과학 및 행동과학에서 밝혀진 바, 인간은 세상을 ‘인지 지도 (cognitive map)’를 통해 해석하고 적용한다는 점을 AV 설계에 적용하였음. 그 결과 모든 도로 이용자에게 가해지는 전체 위험은 26.3% 감소하고,

취약한 도로 이용자에게는 22.9% 감소하는 테스트 결과가 나옴.

5. Trump's assault on the global dollar ('25. 5/21) Martin Wolf

- 달러는 100년 동안 세계 최고의 통화였으며, IMF에 따르면 2024년 미국의 명목 GDP는 전 세계의 26%를 차지 (1980년의 25%와 유사)하며 중국 경제가 급성장한 시기를 감안하면 주목할 만한 성과를 보임. 국제질서를 연구한 찰스 킨들버거는 1) 자유로운 무역시장 2) 안정된 통화 3) 위기 시 최종 대부자 역할 등의 세 가지 공공재를 제공할 수 있는 패권 국가가 필요하다고 말했으며, 1914년 이전 영국은 이를 제공했고, 1945년 이후 미국이 그 역할을 이어받았음. 하지만 그 중간 시기에는 아무도 이를 제공하지 못했고, 세계 경제는 대혼란에 빠졌음.
- 오늘날의 문제는, 미국이 금융 제재 등 모든 경제적 무기를 자기 뜻대로 사용할 경우, 우방국 침공을 위협하거나 독재자의 침공을 조장할 경우, 재정/통화 안정성과 제도적 신뢰 기반이 무너질 경우, 지도자가 원칙 없는 괴롭힘 전문가일 경우이고, 이럴 경우 각국과 투자자들은 대안 통화를 찾기 시작할 수 있는데, 현실적으로 불만족스러운 달러 패권보다 나은 대안이 없다는 점.
- 중국 위안화는 자본통제가 심하고, 중국 금융시장이 비유동적이고, 공산당의 정치/경제 통제 욕구가 강한 단점이 있고, 유로화는 정치적 통합이 아닌 주권국 간의 느슨한 연합이며, 이로 인해 금융/경제적 분열과 성장 및 혁신의 제약이 존재하고, 패권 국가로서의 역할은 불가능하다는 단점. 따라서 현재로서는 세 가지 가능성만 존재함. 1) 중국 또는 유로존이 변화를 통해 패권 통화를 발행하거나 2) 지역별로 2-3개 통화가 경쟁하거나 3) 달러의 지배력이 유지되거나
- 이상적으로는, 신뢰받는 미국이 불활하는 것이 최선이지만, 현재 국내외에서 벌어지는 자해적 행태를 감안할 때 그 가능성은 갈수록 낮아지고 있음. '장님들 사이에 외눈박이가 왕이다'는 속담처럼, 결함 있는 기축 통화조차 다른 대안이 없다면 세계 통화를 지배할 수 있음. 트럼프는 이를 원하지만 대부분의 우리는 그렇지 않다는 주장.

The Big Read Artificial intelligence

The AI revolution changing how we predict the weather

Rapidly advancing technology is helping meteorologists to make more accurate and detailed forecasts even further into the future

Clive Cookson and **Michael Peel** in London

Published 3 HOURS AGO

The era of delivering operational weather predictions by computer began for the UK Meteorological Office in 1965 with a room-sized processor nicknamed Comet. Six decades later, the country's national forecaster is part of another technological revolution, this time driven by artificial intelligence.

AI is supercharging predictions for the ever-shifting patterns of cloud, precipitation and temperature mapped dynamically on a giant screen at the organisation's headquarters in the south-western city of Exeter.

“We see the potential for a real step change . . . in how we forecast, which is in some ways similar to when we started using computers,” says Kirstine Dale, the Met Office's chief AI officer, citing rapidly growing quantities of data, computing power to handle it and models to process it. “It's all just got bigger — and the possibilities have also become much bigger.”

AI's ability to spot patterns in vast troves of data makes the swirling systems of atmospheric physics an ideal opportunity to experiment with the technology. More accurate forecasts and warnings of severe weather could enhance public safety and health, while increasing efficiency across the global economy.

AI has the power to make projections of future weather patterns more accurate and more detailed, opening up new possibilities for groups from farmers to finance companies.



Forecasts have often been used to help pedestrians prepare for rain, but such predictions will become increasingly vital for grid operators as countries adopt weather-dependent renewables © Valery Hache/AFP/Getty Images

The technology is “moving out in timescale” having already reshaped “nowcasting”, or the super-accurate forecasting of the coming hours, says Richard Turner, a Cambridge university machine learning professor. “You’ve seen medium range — three to 15 days — start to get transformed. And now we’re building out to sub-seasonal”, or roughly two weeks to two months, says Turner, who works on AI weather models at the UK’s Alan Turing Institute, the national AI centre.

The opportunities have attracted substantial investments by tech companies including Google DeepMind, Nvidia, Microsoft, IBM and specialist AI weather start-ups, such as US-based Brightband and Silurian.

Organisations throughout the forecasting ecosystem are preoccupied with how best to apply AI to improve our understanding of weather. They include public meteorological offices — some, like the UK Met Office, dating back to the 19th century — as well as universities and specialist companies such as AccuWeather, The Weather Company and DTN. These provide tailored forecasts to users in sectors from energy to construction, agriculture to transport, retailing to tourism, and to the general public via the news media.

But the generally sunny outlook is darkened by the threat of shrinking access to the data on which the AI models depend.

The Trump administration is seeking deep cuts in funding and staffing at the US National Oceanic and Atmospheric Administration, the federal agency dedicated to understanding and predicting changes in climate, weather, oceans and coasts. NOAA’s satellites, ocean buoys, balloons and radars are an important source of data, all of which are freely available to meteorologists worldwide and fed into global forecasting models.

President Donald Trump’s proposed 2026 budget would [cut NOAA’s](#) funding by \$1.5bn, or 24 per cent. Since he took office in January, 550 employees have left its forecasting arm, the National Weather Service. This month, all five of its living former directors signed an open letter warning that the cuts have left local forecasting offices in the US severely short of staff, which could lead to a needless loss of life.

The science of weather forecasting

Starting points for weather forecasts are observations of meteorological conditions such as **air pressure, humidity, temperature and wind speeds and directions**



To ensure conditions over the atmosphere's entire depth are recorded, observations are taken by a variety of devices such as:



Globally, billions of observations are made daily and more than 800mn observations are processed at ECMWF

60mn are selected and are used to provide a set of initial conditions from which to start both physics-based and AI model forecasts

The atmosphere is divided into a series of regular grid blocks

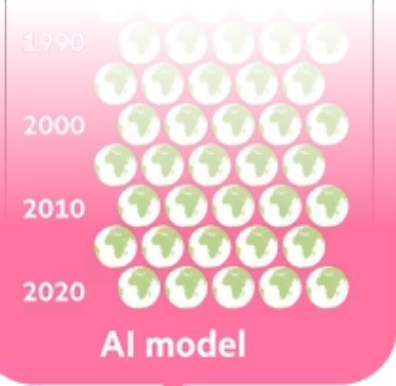
In each block, meteorological quantities are defined by a combination of observational data and physics information coming from the model

Powerful computers employ complex equations to model the interaction of atmospheric elements and forecast upcoming weather patterns

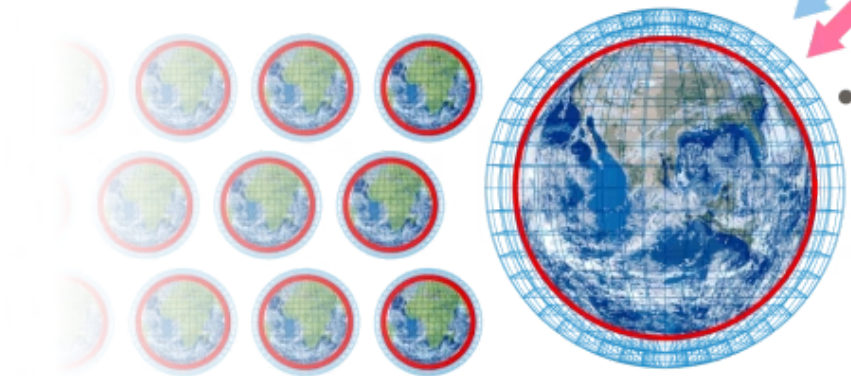
The smaller the dimensions of grid blocks, the higher the resolution of the model but the greater the load on computing power. For every forecast, one can run a single simulation or an ensemble of simulations to describe a range of likely future weather scenarios

How an AI model can help

In ECMWF's case, an AI model analyses a decades-long database of hourly weather information based on the combination of observational data and physical model to learn to recognise patterns and errors



This machine-learnt expertise is then used to create either a single/deterministic forecast called AIFS-single or 50 different scenarios ranked in probabilities called AIFS-Ensemble



Sources: European Centre for Medium-Range Weather Forecasts; Met Office; NOAA; YSE © FT

At the same time, some fear that rising geopolitical tensions could threaten the free flow of public weather data on which the world's forecasters depend.

Although everyone in meteorology laments the potential loss of NOAA data, some point to a countervailing factor — the prospect of new information sources.

The next generation of AI models could improve accuracy by including vast quantities of data from local weather sensors, such as thermometers and rain gauges, that are not currently incorporated into global forecasting systems. “Suddenly we're in this place where a new sensor can be set up and we can ingest that into the model very quickly,” says Scott Hosking, who works on weather prediction at the Alan Turing Institute.

Hosking estimates that 20 to 30 different AI weather models are at various stages of development today, some being run operationally by forecasters. “In a year's time, there will be many more,” he adds.

“How rapidly this has overtaken at least the weather forecasting part of our science is truly remarkable,” says Peter Neilley, senior vice-president of science and forecasting operations at The Weather Company, one of the world's leading forecasting businesses. “It really occurred in the last five years and it's accelerating.”

Until recently, forecasting largely relied on numerical weather prediction, which involves feeding millions of real-time worldwide observations from satellites and sensors on land, sea and air into supercomputers and crunching them with physics-based equations.

This process can be broken down into two steps. The first is data assimilation, which prepares an estimate of the state of the atmosphere, followed by the forecasting stage, which makes predictions about what will happen next.



Food aid is handed out after heavy rainfall and flooding in the Companiganj region of Bangladesh in 2022. Machine learning models are said to be able to predict extreme and unusual events © Maruf Rahman/AFP/Getty Images

The pioneering generation of AI weather systems coming into operation still require computer-intensive data assimilation but they then use machine learning to run the model forward in time.

Early results have been positive. The European Centre for Medium-Range Weather Forecasts, an intergovernmental organisation based in Reading, UK, says its first [operational AI model](#), launched in February, has improved accuracy by about 20 per cent on key indicators such as predicting the path of tropical cyclones, giving valuable extra warning time.

Florence Rabier, ECMWF director-general, believes that new AI technology will build on huge improvements in forecast accuracy achieved over recent decades, as computers became ever more powerful and weather data more plentiful. Predictions seven days ahead now match the quality of those five days ahead in 2000 and three days ahead in 1980.

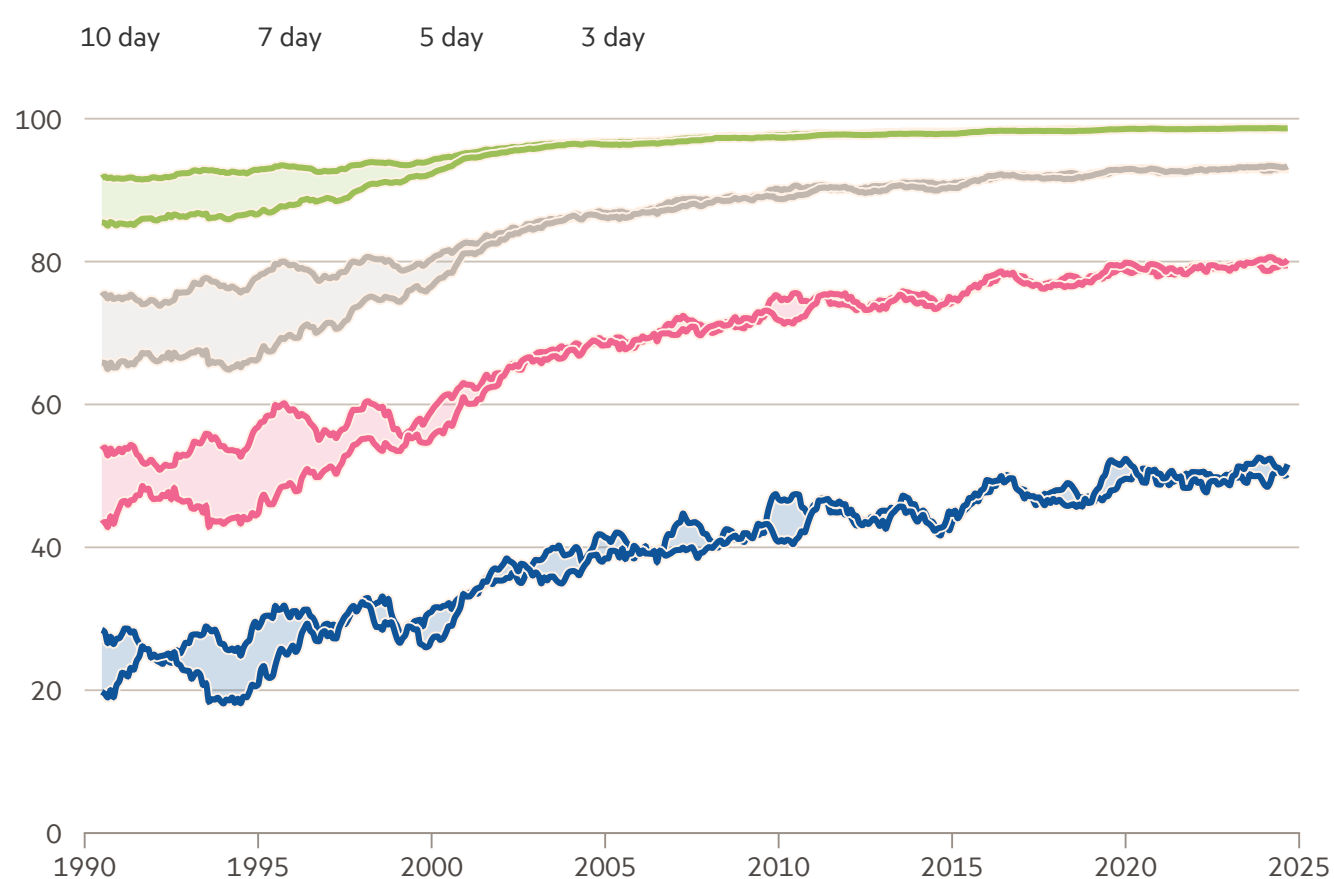
There are global ramifications, she observes. “In the late 20th century, we could predict the weather much better in the northern than in the southern hemisphere because there were so many more observations there,” Rabier says. “Since the beginning of the 2000s, more advanced satellite data have become available and the accuracy gap between the hemispheres has disappeared.”

But a second generation of experimental “end-to-end” AI systems is emerging, which could offer even more exciting possibilities. These new iterations dispense with data assimilation and instead work directly on raw observations from satellites, weather stations and other sensors to generate both global and local forecasts.

In March, a team at the Turing institute, working with ECMWF and other partners, published details of an experimental end-to-end system called [Aardvark](#), which is so energy efficient that it can run on desktop machines rather than supercomputers.

Weather forecasting has become much more precise and the accuracy gap between the hemispheres has disappeared

Anomaly correlation coefficient (ACC)*; different lines within each range represent northern and southern hemispheres



FINANCIAL TIMES

Source: European Centre for Medium-Range Weather Forecasts • *ACC reaching 100% indicates a perfect correlation between the atmospheric flow forecast and the verifying analysis

About 10 other research groups around the world in tech companies and the public sector are developing their own end-to-end models and many more are likely to join in soon, says Turing’s Hosking.

Their output promises to “democratise” forecasting even further, particularly in developing nations and data-sparse regions, where local observations can be added to forecasts with relatively modest computing requirements.

Because AI models are trained on many years of past observations, there have been doubts about how well they will work in future, particularly as the climate changes, says Florian Pappenberger, ECMWF deputy director. But he rejects that criticism.

“We have shown that a machine learning model can predict extreme and unusual events, such as record rainfall in the United Arab Emirates last year and snowfall in New Orleans this year,” he says. “Machine learning learns about physics in general and not just past analogues [patterns] at a given place, so it is much more powerful than some people say.”

The so-called “ensemble technique” has already improved numerical weather predictions. This involves running the computer model many times from slightly different starting conditions instead of producing just a single “deterministic” forecast. This variation gives meteorologists essential information about the level of uncertainty and range of possible outcomes.



Weather forecasts have become more accurate, with today's predictions for seven days ahead now matching the quality of those five days ahead in 2000 and three days ahead in 1980 © H Armstrong Roberts/ClassicStock/Getty Images

But the practice is so resource intensive that it is impractical to produce ensembles with more than about 50 different forecasts, says Dion Harris, director of accelerated data centre solutions for Nvidia, the US chip powerhouse.

This is where AI can be helpful, says Harris. “Using AI techniques, you can literally do thousands of ensembles, which translates into a much better understanding of the potential outcomes and helps you have an earlier indication of extreme events.”

If the new wave of AI models are to fulfil their potential, though, an enhanced flow of weather observations will be essential.

Most of the raw data still comes from the public sector, through forecasters and satellite operators such as NOAA and the European Organisation for the Exploitation of Meteorological Satellites, and is shared freely worldwide.

“The level of international data-sharing has just been fantastic. You can go and get data from Chinese satellites, for instance,” says Turner at Cambridge. “The observations are all put into a pool, because they help everyone else’s forecasting system, and they get people to fire reciprocal data back.”

Any reduction in global data availability, whether from growing geopolitical tensions or cuts to Noaa activities by the Trump administration, “is a huge worry”, says Turner. “The community hasn’t — surprisingly, in my view — woken up to this danger yet . . . Yes, there is massive concern on this and I think the cuts are very dangerous at a time when the climate really is changing.”



Strong winds and high waves hit the west coast of France. More accurate forecasts and warnings of severe weather could help to improve public safety © Fred Tanneau/AFP/Getty Images

Some people in the public sector are thinking about ways to protect — or enhance — the way data is gathered. With the price of building, launching and operating observational satellites in low Earth orbit falling fast, private weather companies are beginning to invest in their own satellite clusters, or constellations.

Tomorrow.io, a Boston start-up, says it has launched two radar satellites and seven microwave sounding satellites that see through clouds to detect rain and snow falling. The company, which has raised \$300mn from investors since its foundation in 2016, plans to launch four more sounders this year and continue adding to its constellation next year.

Each microwave satellite weighs just 12kg and costs less than \$10mn, including launch, says Shimon Elkabetz, Tomorrow.io’s chief executive. “When we started everyone said it would be too expensive to build our own constellation, but the new space economy is enabling us to do things that weren’t possible before.”

But Elkabetz says that while private companies could help to increase the “efficiency and impact” of public sector forecasting, they cannot substitute for the huge national agencies such as Noaa.

For all its promise, meteorologists are still uncertain about how AI will revolutionise forecasting.

On some criteria, such as predicting the intensity of storms, the performance of AI does not yet match the best numerical weather systems.

The atmosphere's intrinsic unpredictability prevents accurate and detailed day-by-day forecasting beyond two weeks or so, irrespective of the technology, says Robert Lee, a meteorologist at Reading university researching subseasonal weather patterns. "But we could predict that there will be a period of a few days with stormy conditions or a few days with cold wintry conditions."

Hedge funds make money [as a result of accurate forecasts]. They hire a lot of our [meteorology] graduates

Being able to see further into the future carries huge benefits. It would be particularly useful as countries become more reliant on clean energy systems that are weather-dependent, such as wind or solar.

"Even if you don't know exactly which day will have the coldest weather, you want to know that you'll have a week of cold weather to be sure you don't have

a shortfall of energy," Lee says. "You might want to buy gas supplies on the futures market as a precaution."

At the same time, after an early heads-up of incoming wet and windy weather "you might want to sell your gas futures because there'll be more wind generation and less demand for power", he adds. "That's how some hedge funds make money. They hire a lot of our [meteorology] graduates."

Advocates of AI say another huge advantage over traditional methods is that it can make very detailed predictions about specific locations. Using generative AI, Nvidia's CorrDiff system can sharpen the precision of data from conventional numerical models from 25km down to 2km.

CorrDiff was originally trained on data from Taiwan, where it is now used operationally for severe weather warnings. It has been adapted to the continental US and will be rolled out in other parts of the world, Harris says.

At the UK Met Office, AI chief Dale says forecasting at scales as small as 100 metres is a viable goal — and was done for a study of hyperlocal [temperature predictions](#) published last year. "That's like street-level forecasting," she says.

Opinion Markets Insight**The new markets for AI data**

Every company should think about its strategy to capture emerging opportunities

KIM POSNETT

Nvidia recently announced an expansion of its robot simulation environment, where it trains its robots in a virtual, digital representation of the physical world © Josh Edelson/AFP/Getty Images

Kim Posnett

Published 3 HOURS AGO

The writer is the global co-head of investment banking at Goldman Sachs.

Data is the foundation of the artificial intelligence revolution, but AI is also revolutionising the market for data. Developers are racing to invest billions of dollars to build the infrastructure to power vast AI systems. That rapid expansion has led to a surge in demand for data, creating the potential for companies to generate significant economic value.

AI systems are typically described as having three main components — power, compute and data. These refer to the electricity required to power data centres, the chips needed to conduct computations at mind-boggling speeds, and the data necessary to train AI models. Of these critical components, it is data that is least discussed, perhaps because data centres and [semiconductors](#) are physical things you can see and touch. (It's admittedly difficult to hold up a data packet during an onstage keynote.)

But sourcing data is an essential aspect of the rapidly expanding AI ecosystem. According to some estimates, the world is running out of “organic” [data](#), with model developers reaching the limits of publicly available data — essentially copies of the entire internet — to pre-train ever-bigger models.

After AI models are constructed and pre-trained on huge data sets, they still require additional “test time compute” where a model is asked to answer specific questions or solve problems. This requires the right kind of data, which is sometimes lacking.

There is a lack of sufficient training data that shows humans “showing their work” in the steps to address complex problems. This is where companies with focused, well-organised, or highly logical data sets can become newly relevant. Imagine how a textbook company might use its archives of technical manuals and coursework to train an AI system to do complex scientific processes.

Recent data licensing deals show how different companies are selling access to their data to AI companies. Expect this trend to accelerate as companies get even more creative in doing so. So far, these deals have been negotiated individually with special terms, but you can imagine a marketplace — or multiple markets — for training data emerging.

Synthetic data, or data created at least in part by AI systems, is a critical part of the development of large language models and has emerged as one path for expanding the set of options for developers looking for new data sets.

For example, as robotic technology becomes more sophisticated, AI systems can increasingly create maps of our physical environment. Synthetic data for self-driving might involve setting up a “digital twin” of Los Angeles and having millions of “mock” vehicles navigate the city in a virtual space as training data.

And it is possible that types of data that have previously been difficult to analyse or use become newly accessible and valuable with the incredible computational power of AI systems. Think about what data we’ve collected about complex systems such as weather, quantum mechanics or viral mutations. As robots can perceive entire categories of data that are imperceptible to humans, collections of video and spatial data may also suddenly have a newfound value.

Tesla uses the data collected by its fleet of autonomous driving vehicles to train the AI models that power its underlying self-driving technology. And Nvidia recently announced an expansion of its robot simulation environment, where it trains its robots in a virtual, digital representation of the physical world.

One of the most valuable repositories of data is human-generated data that remains locked away — proprietary research behind corporate and government firewalls. Today, the holders of this data are reluctant to make it accessible without knowing the implications. But the right structures and incentives can invite more deals.

In practical terms, different companies will devise different strategies. Some will treat data as a core business asset, not a byproduct, and work to monetise it through licensing or subscriptions. Others will need to upgrade their data infrastructure to make the best use of future AI capabilities.

How different jurisdictions decide to regulate AI and further regulate data usage will have profound implications for how those markets evolve — and where. Data privacy and security, questions about data provenance, ownership, authentication, are all potential new legislation areas.

This period of incredible innovation and upheaval offers opportunities for the companies that get their data strategy right.

Opinion Women in business**Are female experts more credible?**

Public perception of stereotyped discrimination has one surprising outcome

SARAH O'CONNOR

US economist Janet Yellen. Members of the public assume the bar is higher for women in certain male-dominated professions © Graeme Sloan/Sipa USA/Reuters

Sarah O'Connor

Published 4 HOURS AGO

Imagine an experiment in which the (otherwise identical) views of senior male or senior female economists are presented to the public. Which would you expect to be more persuasive? I think my first guess would be “neither”, in line with former British politician Michael Gove’s famous pronouncement during the [Brexit campaign](#) that people “have had enough of experts”. Failing that, my next guess would be “the men”, based on research which suggests there is often still an [“authority gap”](#) in the way people perceive men and women. But when economists Hans Henrik Sievertsen and Sarah Smith performed this experiment [in real life](#), the results proved me wrong on both counts.

Sievertsen and Smith showed about 3,000 members of the public in the US a series of statements about economic issues, from financial regulation to windfall taxes and AI. They let them know whether a real-life named economist strongly agreed, agreed, was uncertain, disagreed, or strongly disagreed with that statement. Then they asked the person for their own opinion. The expert opinions were drawn from a panel [run by the University of Chicago](#), which regularly elicits the views of leading academic economists at top US universities on various topics.

The study found that public opinion on these issues was influenced by the views of the economists. Even more interestingly, the female economists were more influential than the male ones. The additional effect of seeing an opinion expressed by a female expert was 20 per cent greater than the effect of seeing the same opinion expressed by a male expert.

Why might that be? In search of answers, the researchers reran the experiment, but this time they removed information on the expert's credentials (their professor title and the name of their university). When the only thing the public knew was that they were "economists", the gender gap disappeared: the men and women were equally persuasive with the public.

For Sievertsen and Smith, the best explanation for their findings is that members of the public are making an assumption of their own: that to have become professors at prestigious universities in a male-dominated field, the women must be more impressive than the men. "Put simply, visibly successful women, if they have "made it" in stereotypically male domains, may be perceived as better than their male counterparts," they wrote in their paper.

Some other studies have found a similar phenomenon. In one [experiment](#), academics ran some [game-based tests](#) in Ethiopia to study whether people followed advice differently when they were randomly assigned a male or a female leader (who were otherwise identical). That experiment found that people were less likely to follow a female leader's guidance. But when the researchers told a subset of people that their leader was of high ability, people became more likely to follow the guidance of the "high ability" female than the "high ability" male.

Are people correct to assume that a woman who has succeeded in a male-dominated field must be *better* than their male counterparts? Or is this very unfair to men? “I wouldn’t say we know that women have to be better” to make it to the top in economics, Smith told me. “But we certainly know there is stereotyped discrimination against women further down the process.”

In one study, for example, machine learning techniques were used to study the audio recordings of more than 1,700 economic seminars. The [analysis](#) found that female speakers were interrupted more frequently and earlier than male speakers and that the extra interruptions largely stemmed from female, rather than male, audience members. The study also found men were more likely to make comments rather than ask questions of female presenters.

Another [study](#) found that men were given tenure at roughly the same rate regardless of whether they co-authored research papers or wrote them alone, whereas women became less likely to receive tenure the more they co-authored papers.

Whether or not members of the public are correct to assume the bar is higher for women in certain male-dominated professions, it is useful to know that is the assumption they may be making.

If, say, you are a senior woman in a male-dominated field and you’re about to do something public-facing, it suggests you should silence the inner voice which whispers that the audience might dismiss or discount your expertise. In fact, they might well be thinking: “She must be seriously impressive to have got to where she is. I’m going to listen to what she has to say.”

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Follow the topics in this article

Driverless vehicles

Autonomous cars with 'social sensitivity' cut threat to road users, study finds

Driverless vehicles that respond more like humans will cause less harm during road crashes, according to research



A Tesla Model Y in autopilot mode © Imago/Alamy

Michael Peel in London

Published 5 HOURS AGO

Autonomous cars that are trained to respond more like humans to danger will cause fewer injuries during road accidents, according to a study that shows how driverless vehicles might be made safer.

Vulnerable groups such as cyclists, pedestrians and motorcyclists saw the biggest gains in protection when [driverless cars](#) used “social sensitivity” in assessing the collective impact of multiple hazards.

The [study](#), published in the US Proceedings of the National Academy of Sciences, highlights growing efforts to balance AVs’ efficient operation with the need for them to minimise damage in collisions.

The research comes as leading tech companies such as [Tesla](#), [Google's Waymo](#) and [Amazon's Zoox](#) push to roll out AVs — which use a range of sensors and automated software to drive without human intervention — around the world. Manufacturers must train AVs to respond instantly to real-world dilemmas, such as what to collide with if a crash becomes unavoidable.

The issue of AV ethics is attracting increasing attention as growing use of the cars offers the prospect of eliminating driver problems such as spatial misjudgments and fatigue.

The study suggests human behavioural methods could “provide an effective scaffold for AVs to address future ethical challenges”, said its China- and US-based authors, led by Hongliang Lu of The Hong Kong University of Science and Technology.

“Based on social concern and human-plausible cognitive encoding, we enable AVs to exhibit social sensitivity in ethical decision-making,” they said. “Such social sensitivity can help AVs better integrate into today’s driving communities.”



Pedestrians exit a Waymo self-driving car © Smith Collection/Gado/Getty Images

“Social sensitivity” included being attuned — like human drivers — to the vulnerabilities of specific road users and being able to judge who was likelier to be more seriously hurt during a crash.

The researchers drew on evidence from neuroscience and behavioural science that humans navigate using a “cognitive map” to interpret the world and adapt accordingly.

The scientists based their instructions for the AV on a concept known as “successor representation”, which encodes predictions of how different elements in an environment will interrelate across time and space.

They examined the results of harnessing their model to EthicalPlanner, a system AVs use to make decisions accounting for various risk considerations. The researchers modelled 2,000 benchmark scenarios, measuring total risk of each one by assessing the probability of collision and the likely severity of harm for the people involved.

The scientists found that using their human-inspired model with EthicalPlanner cut overall risks to all parties by 26.3 per cent and by 22.9 per cent for vulnerable road users, compared with using EthicalPlanner alone.

In crash scenarios, all road users suffered 17.6 per cent less harm, rising to 51.7 per cent for vulnerable users. The occupants of the AV were also better off, experiencing 8.3 per cent less harm.

Opinion **US dollar****Trump's assault on the global dollar**

The difficulty is that, however unsatisfactory the hegemon might be, the alternatives look worse

MARTIN WOLF



© James Ferguson

Martin Wolf

Published YESTERDAY

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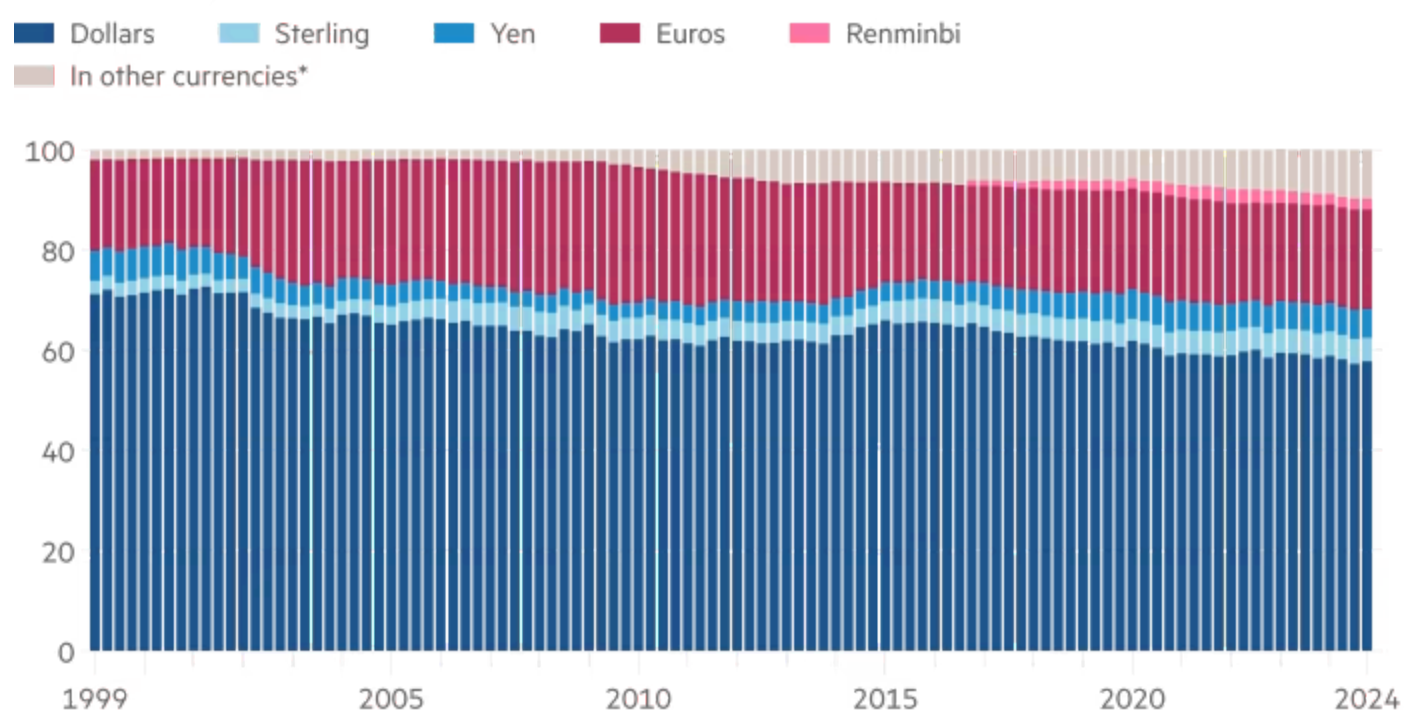
Is the dominance of the dollar about to fade away? Donald Trump [insists that](#) “if we lost the dollar as the world currency . . . that would be the equivalent of losing a war”. Yet he himself could be the cause of such a loss. Reliance on a foreign currency depends on trust in its own soundness and liquidity. Trust in the dollar has been slowly eroding for a while. Now, under Trump, the US has become erratic, indifferent and even hostile: why would one trust a country that has launched a trade war on allies?

Yet, while outsiders might wish to diversify away from the dollar, they lack a compelling alternative. So, what, if anything, might replace its hegemony?

The dollar has been the world's leading currency for a century. Yet the dollar itself replaced the pound sterling after the first world war, as the UK's power and wealth declined. Objectively, the US is not declining as the UK was at that time: according to the IMF, its share in nominal global GDP was 26 per cent in 2024, against 25 per cent in 1980. Given the rise of China's economy during that period, this is remarkable. The US also remains at the frontier of world technological development and the foremost military power. Its financial markets are still much the deepest and most liquid. Moreover, in the fourth quarter of last year, 58 per cent of global reserves were in dollars, down from 71 per cent in the first quarter of 1999, but far ahead of the euro's 20 per cent. According to [MacroMicro](#), 81 per cent of trade finance, 48 per cent of international bonds and 47 per cent of cross-border banking claims are still in dollars.

The share of the dollar in currency reserves is high but falling

Currency composition of official foreign exchange reserves (% of allocated reserves)



* includes renminbi pre-2016

Source: IMF

So what could go wrong? In his work on the international system, [Charles Kindleberger](#) argued that the stability of an open world economy depended on the existence of a hegemonic power willing and able to provide essential public goods: open markets for trade; a stable money; and a lender of last resort in a crisis. The British provided all three up to 1914. The US was to do so after 1945. But in that intervening period the UK could not — and the US would not — provide these goods. The result was calamitous.

The demand for currency reserves has stabilised after the crises

Official foreign exchange reserves, global total (\$tn)

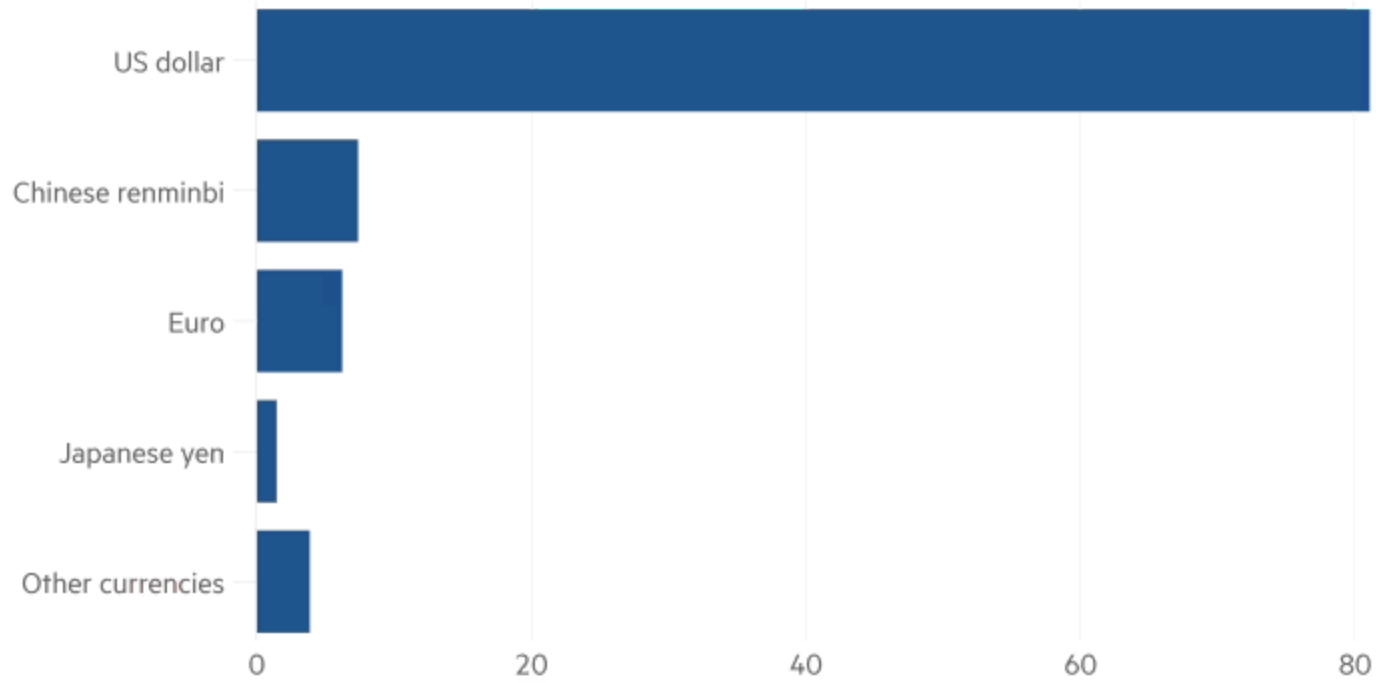


Source: IMF

The era of dollar hegemony has seen many shocks. The postwar recovery of Europe and Japan undermined the fixed exchange rate system agreed at Bretton Woods in 1944. In 1971, Richard Nixon, the president most similar to Trump, devalued the dollar. This, in turn, led to high inflation, which ended only in the 1980s. It also led to floating exchange rates and creation of the European exchange rate mechanism and then the euro. While economists tended to think that currency reserves would cease to be important in a world of floating rates, a plethora of financial and currency crises, above all the Asian crisis of the late 1990s, showed the opposite. Loans from the Federal Reserve also proved of continuing importance, notably in the financial crisis of 2008-09.

The US dollar is overwhelmingly dominant in trade finance

Share of global trade finance via the Swift payments system, by currency, Mar 2025, %

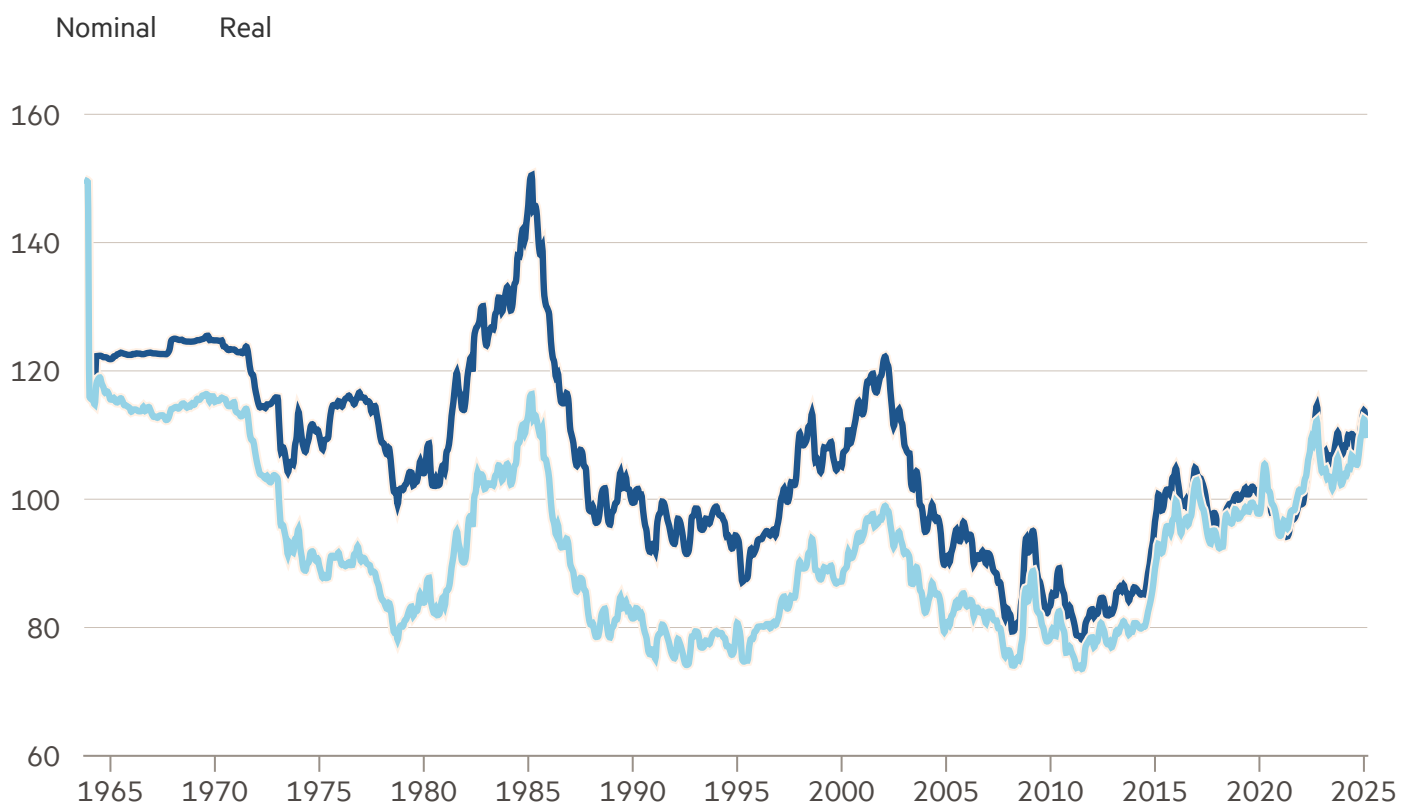


Source: MacroMicro

The Kindleberger conditions are, in short, still relevant. Also relevant is the broader point that network externalities support the emergence and sustainability of dominant global currencies, since all users benefit from using the same currency as others and will continue to do so, if they can. But what if the hegemon uses every economic stick it can, including financial sanctions, to get its way? What if the hegemon threatens invasions of friendly countries and encourages invasions of friendly countries by despots? What if the hegemon undermines its own fiscal and monetary stability and the institutional foundations of [its economic success](#)? What if its leader is an unprincipled bully?

The nominal and real external value of the dollar has been quite robust

Dollar effective exchange rate indices (BIS narrow indices, 2020=100)



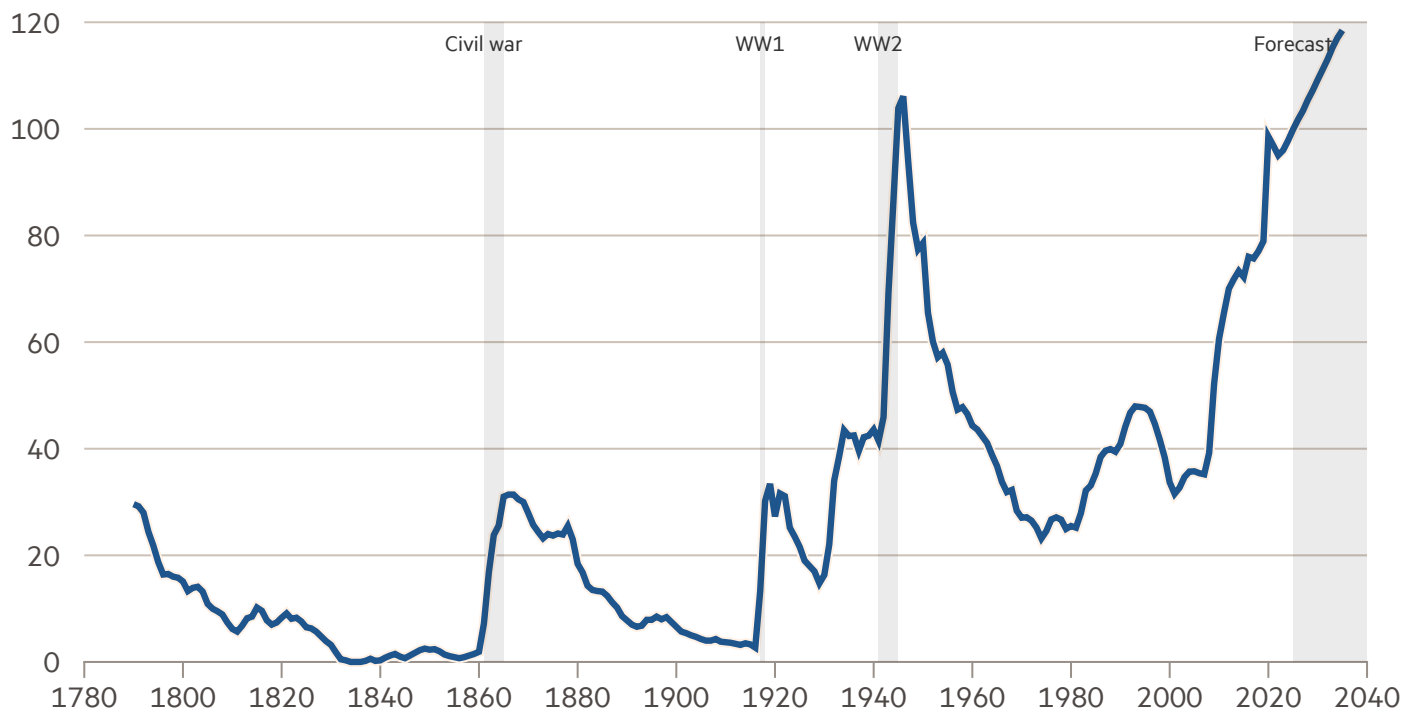
FINANCIAL TIMES

Source: BIS • Real index is CPI-based

Then both countries and individuals will consider alternatives. The difficulty is that, however unsatisfactory the hegemon might be, the alternatives look worse. The renminbi might be the best currency to use in trading with China. But China has capital controls and illiquid domestic capital markets. These, moreover, reflect the strategic priority of the Chinese Communist party, which is control, both economic and political. China seems quite likely to use economic coercion, too. So, China cannot offer the liquid and safe assets that the US has historically provided.

US public debt as a share of GDP is set to reach an all-time high

US federal debt held by the public, as a % of GDP



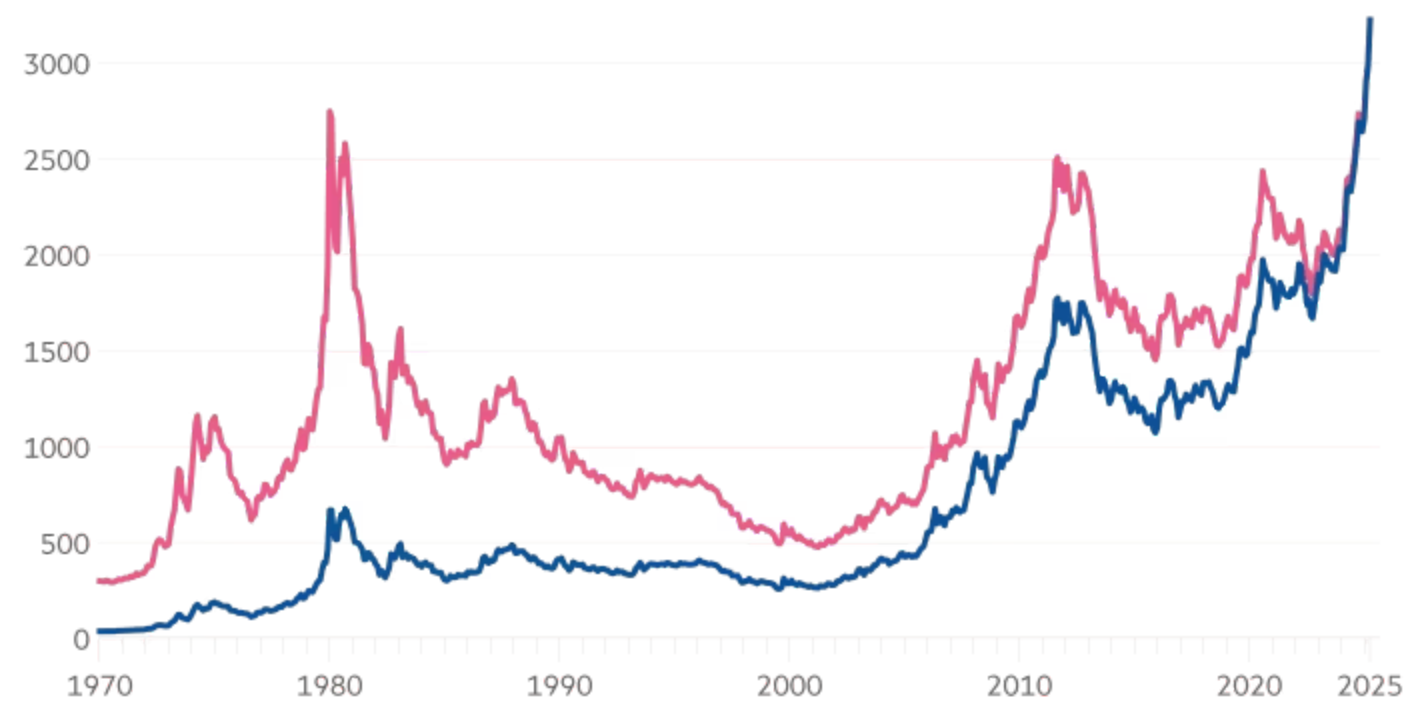
FINANCIAL TIMES

Source: CBO

The euro does not suffer from these handicaps of the renminbi. So, might it not replace the dollar, at least in part, as [Hélène Rey of the London Business School argues](#)? Yes, it might. But it too suffers from defects. The Eurozone is fragmented, because it is not a political union, but rather a club of sovereign states. This political fragmentation also shows in financial and economic fragmentation, which constrains innovation and growth. Above all, the EU is not a hegemonic power. Its appeal may surpass that of the US at its current worst, but it is no match for the US at its best.

The price of gold reveals concerns about inflation

Gold price (\$ per troy oz, monthly averages) Real price (Apr 2025 \$)



Sources: LSEG, FT calculations

We are left then with a competition between three alternatives, with some other options — a global currency or a crypto-based world — surely inconceivable. The first option would be transformation of China or the Eurozone and so the emergence of one of them as issuer of a hegemonic currency. The second would be a world with two or three competing currencies, each dominant in different regions. But network effects would create unstable equilibria in such a world, as people rush from one currency to another. This would be more like the 1920s and 1930s than anything since then. The third would be continued domination by the dollar.

What sort of dollar hegemony might this be? Ideally, a trustworthy US would re-emerge. But this is ever more unlikely, given the damage now being done at home and abroad. In the kingdom of the blind, the one-eyed man is king. Similarly, even a defective incumbent currency might continue to rule the monetary world, given the lack of high-quality substitutes. Trump would like this world. Most of the rest of us would not.

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