

Financial Times 번역요약본 ('25. 6/10)

1. Europe's fight to get rid of 'forever chemicals' ('25. 6/2)

- 유럽에서 추적이 어려운 화학물질을 감지하기 위한 새로운 분석법을 시험하던 중, '삼불화초산 (TFA)'라는 이름의 잘 알려지지 않은, 사실상 파괴가 불가능한 인공화합물을 발견하였음. 독일 환경 연방청은 추가 조사를 통해 유럽에서 널리 사용되는 여러 제조제가 결국 TFA로 분해되며, 산업공정, 농약, 냉매 등의 부산물로 생성되는 TFA는 물에 쉽게 녹고 제거가 매우 어려워, 자연과 인체에 축적되는 '영원한 화학물질 (PFAS)'중 가장 심각한 위협으로 부상하였음. 현재 알려진 PFAS는 1만종이 넘으며 계속 증가중이고, 이들은 암 발생률 증가, 불임, 호르몬 이상 등과 관련이 있지만, 녹색 기술이나 반도체 산업 등에 필수적인 경우가 많아 대체제가 부족한 상황임. 이 문제는 단지 환경 문제가 아니라, 유럽의 산업 생존과도 맞물려 있고, 규제가 강화되면 생산 비용이 올라가고 경쟁력이 약화된다는 것이 업계의 입장. 바이엘, BASF 등 유럽의 주요 농약 및 화학업체들은 규제에 강하게 반발하고 있으며 바이엘은 독일 정부가 자사 제조제 '플루페나셋'을 금지하려 하자 법적으로 대응했고, 유럽연합도 최종 결정을 보류한 상태임. EU는 2034년부터 PFAS에 대한 수질 규제를 시행하겠다는 방침이지만, 아직 갈 길이 멀. 식물 보호제는 규제가 시작되겠지만, 냉매나 산업 폐수 쪽은 아직 미비하며, 해결책을 찾아야 한다는 주장이 나오고 있음.

2. The mounting pressure on bond markets ('25. 6/6)

- 미국, 일본, 영국 등 주요국의 30년 만기 국채 수익률은 수십 년 만에 최고 수준에 도달하였고, 이는 국가 부채의 지속 가능성 문제가 정치적 핵심 의제로 부상하고 있음을 보여주며, 여러 국가에서 이자 비용 상승은 정부의 다른 지출 영역을 압박하고 있음. 미국 국

채 시장 (29조 달러 규모)에서 장기 수익률이 5%를 넘어섰으며, 이는 인플레이션 억제를 위한 고금리 기조가 지속될 것이란 우려가 반영된 결과임. 일부 국가들은 단기물 위주 발행으로 전환하거나 중앙은행의 보유채권 매각 (양적 긴축)을 보류하려 하고 있으나, 지속적인 재정 지출을 줄이지 않는 한, 장기적으로 구조적 해법이 되긴 어려움. 무디스는 지난 5월 미국의 AAA 신용등급을 박탈했고, 일부 전문가들은 이를 '재정 파탄의 전조'라고 평가했으나, 많은 투자자들은 미국이 당장 파산으로 치달을 가능성은 낮고, 오히려 인플레이션 허용을 통해 실질 부채를 줄이는 방식으로 대응할 가능성이 높다고 예상함.

3. Solar group OCI doubles down on US despite Donald Trump's war on clean energy ('25. 6/7)

- 한국의 태양광 셀 제조업체 OCI홀딩스는 도널드 트럼프 대통령의 청정에너지 보조금 삭감을 공헌한 상황임에도 불구하고, 미국 내 생산을 대폭 확대하고 있음. 회사 측은 이를 '일생일대의 기회'라며 데이터센터 수요 증가에 따른 전력 수요를 겨냥하고 있다고 밝힘. 세계 최대 규모의 태양광 발전 개발업체 중 하나인 OCI는 오는 2027년까지 미국 텍사스 공장의 연간 셀 생산 능력을 10GW까지 끌어올리기 위해 12억 달러 (한화 약 1.6조원)를 투자할 계획이며, 이는 원자력 발전소 10기에 해당하는 전력을 생산할 수 있는 규모임. 공동 대표이자 회장인 이우현 회장은 'AI 열풍 속에서 미국 내 대형 데이터센터들이 속속 들어서고 있으며, 미국의 에너지 공급이 빠듯한 상황에서 태양광 없이 급증하는 수요를 감당할 방법은 없다'고 말함. OCI는 말레이시아에 폴리실리콘 공장을 보유하고 있으며, 동남아시아에서 웨이퍼를 제조한 후 미국으로 수출해 셀을 생산할 계획임. 중국은 여전히 세계 태양광 셀의 85%, 폴리실리콘의 79%를 생산하고 있으며, 중국산 패널은 와트당 10센트로 미국산의 30센트보다 저렴함. 이 회장은 '중국을 벗어난 공급망을 구축하려면 적어도 3년간의 보복관세 유예기간이 필요하다'며 명확한 가이드라인을 요

청함.

4. Chinese regulators seek to slow rollout of self-driving features in cars ('25. 6/7)

- 중국 자동차에 자율주행 기능이 빠르게 탑재되면서, 베이징 규제 당국은 안전성과 책임 문제를 점검하기 위해 업계에 속도조절을 요청하고 있음. 명확한 법적 규정이 없는 상황에서도, 중국에서 판매되는 신차의 약 20%는 고급 자율주행 기능을 탑재하고 있으며, 이에 베이징 당국은 뒤늦게 대응에 나서며, 관련 기술에 대한 규제 체계를 정비하는 동안 자율주행 기술의 확산 속도를 늦출 것으로 보임. 자율주행 레벨 2단계인 '운전자가 항상 주의를 유지하며 일부 속도 및 조향 지원 가능'은 공식 분류는 없지만 중국 내에서 대부분의 차량 광고에서 사용되고 있으며, 레벨 2+단계인 '차선 변경, 도시 내 핸즈프리 주행 등 고급 기능'은, 중국 내에서 일부 기업만 시험 운영을 허가하고 있음. 레벨 4인 '정해진 조건 내 완전 자율주행 (운전자의 개입 불필요)'는 로보택시를 시범 운영 중임. 중국은 사고 발생 시 책임 소재 (운전자, 제조사, 보험사 간 분배)와 보험료 책정 기준 등에서 여전히 해외 모범 사례를 참고하고 있지만, 기술 진화 속도를 따라가기 어려운 법적, 제도적 공백이 존재함. 현재 중국에는 20여 개 도시에서 자율주행 시범구역이 승인되었으며, 베이징, 상하이, 선전, 충칭, 우한 등지에서 대규모 로보택시 테스트가 진행 중임. 골드만 삭스는 향후 5년 내 중국의 로보택시 차량 수가 50만 대를 넘어서고, 2035년까지 시장 규모가 470억 달러에 이를 것으로 전망.

5. Apple's struggles to update Siri lead to investor concerns over AI strategy ('25. 6/8)

- 애플이 아이폰용 인공지능 음성비서 Siri의 업그레이드를 제대로 구현하지 못하며, 다음 주 예정된 연례 개발자 행사 (WWDC)에서 AI 관련 주요 발표에 대한 기대감이 낮아지고 있음. Siri는 수익 대의

애플 기기에 탑재된 핵심 기능으로, 애플은 기계학습 기술을 기반으로 자체 LLM (대형 언어모델)을 구축해 자연스러운 대화형 음성비서를 만들겠다는 목표를 세웠지만, 기존 기술과의 통합 과정에서 잦은 버그가 발생해 진척이 더딘 상태이며, 이는 처음부터 생성형 AI 기반으로 음성비서를 구축한 OpenAI 등 경쟁사에서는 발생하지 않았던 문제임. 애플의 AI 추진 지연은 주가에도 부정적인 영향을 주어, 2025년 현재 애플은 이른바 '매그니피센트 7' 기술주 중 올해 최악의 실적을 기록하며 연초 대비 약 18% 하락함. 여기에 트럼프의 관세, 중국 내 경쟁 심화, 고수익 서비스 부문에 대한 법적 압박 등이 더해지면서 장기 성장에 대한 의문도 커지고 있음. 애널리스트들은 '지금 속도라면 애플이 구글 등 경쟁사처럼 진정한 현대적 AI 비서를 선보이기까지는 최소 3년 이상이 걸릴 것'으로 전망하고, 팀 쿡 CEO도 최근 인터뷰에서 '기술이 우리의 '높은 품질 기준'에 도달하지 못해 예상보다 더 오래 걸리고 있다'고 인정함.

The Big Read Pollution

Europe's fight to get rid of 'forever chemicals'

A man-made molecule called TFA is seeping into waterways across the continent. But industry executives warn about the cost of EU efforts to eradicate pollution

Patricia Nilsson and **Florian Müller** in Frankfurt and **Alice Hancock** in Brussels

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The German scientists testing water in the Neckar river, which runs through the city of Heidelberg, initially thought their equipment had malfunctioned.

Trialling new methods to detect previously untraceable chemicals, they uncovered a contaminant spreading through Europe's waterways: a little-known but seemingly indestructible substance called trifluoroacetic acid (TFA).

The team from the Karlsruhe Water Technology Center was deeply unsettled. "We had never seen anything like it," says Karsten Nödler, who supervised the study in 2016.

Word soon reached Germany's Environment Agency. Digging deeper, the agency found that several of Europe's most widely used herbicides were breaking down into the very same compound.

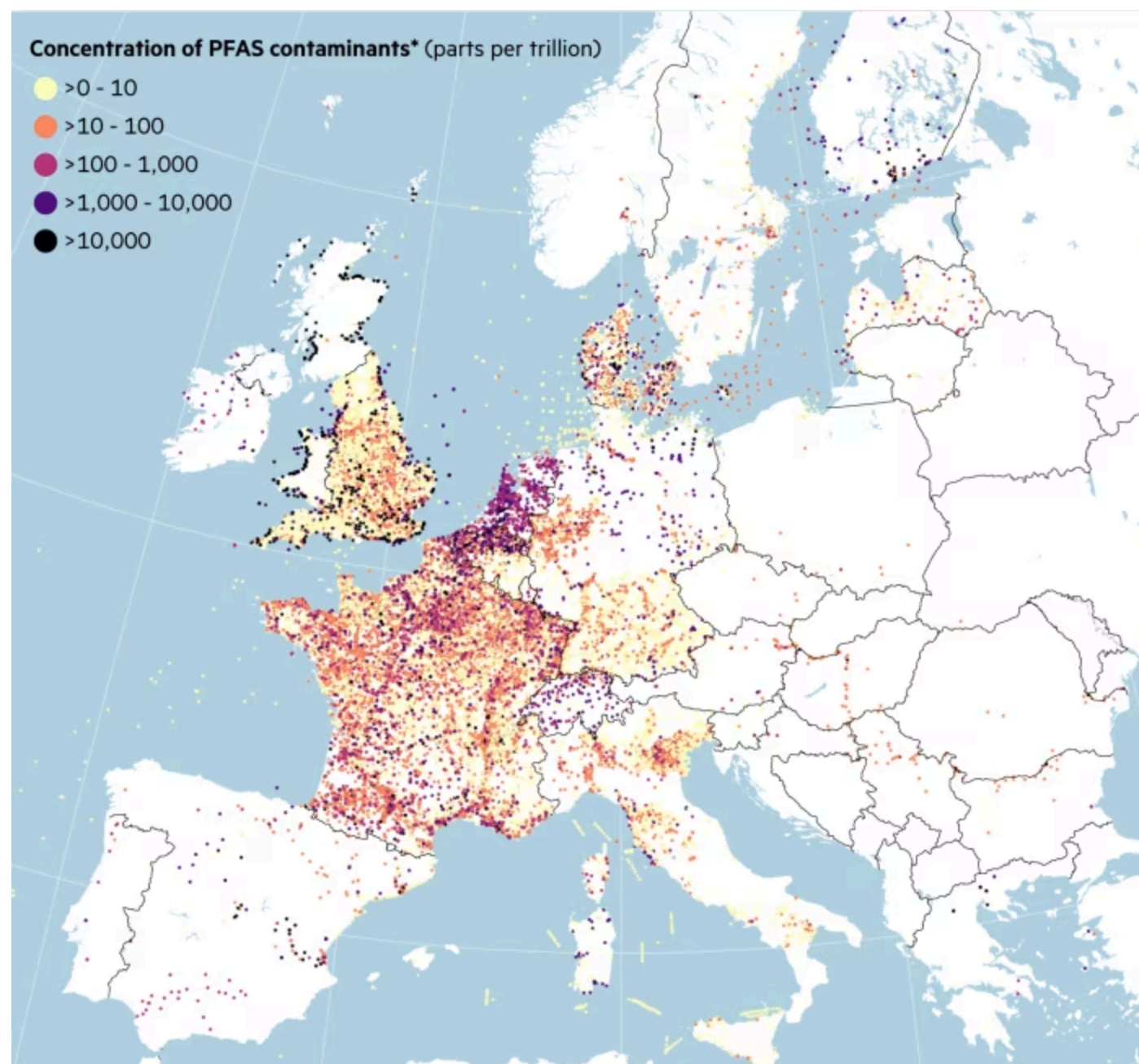
"It was a regulatory breakthrough," says Helena Banning, a pesticides expert at the agency who was one of the first to make the link.

German scientists and regulators have since become the driving force behind a European effort to understand and contain the spread of TFA — a vanishingly small, man-made molecule that is used in industrial processes and which is also a byproduct of pesticides and refrigerants.

TFA, which dissolves in water and resists all attempts at removal, has emerged as the frontline threat in the struggle against "forever chemicals": synthetic substances that cannot be destroyed and accumulate in the environment and, ultimately, human bodies.

With the list of known forever chemicals exceeding 10,000 and growing, regulators are rushing to find solutions. Collectively called per- and polyfluoroalkyl substances — PFAS for short — they have been linked to rising rates of cancer, fertility problems and hormonal disruption. Yet they are critical to industries such as green tech and semiconductors, and alternatives are scarce.

'Forever chemical' pollution across Europe



Source: PFAS Data Hub
© FT

*does not include TFA, for which data is patchy

While early studies suggest that TFA may not be among the most hazardous of PFAS, its unusual tendency to dissolve in water rather than bind to soil or organic matter means that it can spread rapidly through rivers and rain.

“TFA is the PFAS that we are most exposed to,” says Hans Peter Arp, professor at the Norwegian University of Science and Technology.

A German study from 2022 found TFA concentrations in rain had risen fivefold since the 1990s. In Denmark, TFA concentrations in groundwater have increased over 10 times in the same period. A study published last year by anti-pesticide network PAN Europe found that TFA accounted for 98 per cent of the PFAS detected in water samples from 10 EU countries.

The problem is only going to grow, says Dirk Messner, president of the German Environment Agency, explaining that the number of chemicals that break down into TFA is “constantly increasing”.

Citing industry-sponsored studies that showed damage to rabbit and rat fetuses, last year the German Federal Institute for Risk Assessment formally requested that the European Chemicals Agency (ECHA) reclassify TFA as “presumed” toxic to human reproduction.

Last week, ECHA announced that it was examining the request and had opened a public consultation, expected to last 60 days. The agency will eventually make a recommendation to the European Commission on how the substance should be labelled and controlled, something it expects to take a couple of years.

TFA at a glance

Trifluoroacetic acid is a man-made molecule
Highly mobile substance can reach all parts of the water cycle (spreads rapidly through rivers and rain)
This byproduct of pesticides, refrigerants and industrial waste resists all attempts at removal
Studies show it accounting for 98% of 'forever chemicals' in EU water supplies

Meanwhile, the war against forever chemicals has become part of another battle: that between the EU's green ambitions and the bloc's struggling industrial sectors. As Brussels pursues tougher environmental rules, business leaders warn that Europe's determination to be a pioneer in limiting pollution will come at a heavy cost and reduce competitiveness with countries such as the US and China.

Should the European Commission clamp down on TFA, the fallout would be far-reaching. As well as imposing strict limits on permissible levels in drinking water, this would probably trigger bans on

some pesticides and sweeping curbs on refrigerants and other chemicals at a time when industry is already struggling with high energy costs and an escalating trade war.

“You see [environmental] rules and regulation becoming stricter and stricter — with reason, possibly — but as an industrial player, at a certain point the business case is no longer there,” says one European executive, whose business is linked to TFA emissions.

But scientists such as Arp say that it will take years, if not decades, to stem the proliferation of TFA. “This is a multigenerational contamination problem,” he says, adding that action needs to be taken now.

It is precisely TFA's property of dissolving in water — the very trait that has made it so widespread — that for a long time allowed it to evade tests designed to detect forever chemicals. Even after environmental scientists, including the team in Heidelberg, sounded the alarm, many regulators were slow to respond.

Under the Biden administration, US regulators considered TFA, an ultrashort-chain molecule, too small to be harmful. In Europe, its water solubility and ability to move so fast led regulators to dismiss the risk of it accumulating.

Christine Hermann, policy officer for chemicals at the non-profit European Environmental Bureau, says that a few years ago TFA was not considered to be “a problematic PFAS — almost the opposite”. The long-standing underestimation of its risk has now become “a huge issue,” she argues.



The grape harvest in the steep vineyards over the Neckar river, which runs through Heidelberg. Research has found that wine made from European grapes contained up to 100 times the TFA levels typically found in drinking water © Thomas Kienzle/AFP/Getty

Studies are beginning to show that TFA concentrates in food, particularly in high-water-content produce such as fruits and vegetables. Research published by PAN Europe in April found that wine made from European grapes contained up to 100 times the TFA levels typically found in drinking water. Other studies have reported rising concentrations of TFA in human blood and breast milk.

“Once we started looking for it, we could find it in literally everything,” says Arp.

One big source of TFA pollution is its use as a solvent in the manufacture of pharmaceuticals and other products, which requires it to be produced in large quantities. In the 2016 Heidelberg study, scientists ended up tracing the contamination to a Solvay chemical plant near Bad Wimpfen, about 80km upstream.

The Belgian company had been producing TFA in Germany since the 1990s and releasing treated wastewater under regulatory approval. At peak levels, the plant had been discharging up to 12 kilogrammes of TFA per hour. Another contamination case was discovered in Lyon last year, also traced to a Solvay plant that was producing TFA for the pharmaceutical and automotive industries and other applications.

Solvay says it “places safety and compliance at the heart of its operational priorities”.

These cases resulted in far higher local concentrations of TFA than contamination from pesticides and refrigerants, which account for most TFA emissions but disperse more widely. But they showcase the limited options for solving the problem.

Heidelberg’s authorities responded to the crisis by cutting off highly contaminated groundwater sources and importing millions of cubic metres of drinking water from neighbouring municipalities and using them to dilute local supplies. Oliver Loebel, secretary-general of European water sector lobby group EurEau, says that the only other option would have been reverse osmosis — a process comparable to saltwater desalination.



The Solvay plant in Bad Wimpfen, Germany, where TFA is still being used as a raw material and emitted into the Neckar river © Colin Utz/Alamy

This is not only prohibitively expensive, but wastes up to 25 per cent of the treated water — producing a brine so concentrated that it needs to be kept out of the ecosystem indefinitely.

Loebel says that the rapid proliferation of TFA in European drinking water is “really one of the major worries that I hear”. Urgent regulation is needed, he says. “We see [TFA] concentrations increasing, so we cannot wait.”

EurEau is calling on the EU to ban TFA emissions, phase out PFAS-containing pesticides, set a strict drinking water limit and ensure that polluters — not water providers and consumers — bear the cost of clean-up.

In 2018, the Heidelberg authorities sued Solvay for €1.4mn in damages, with the two parties reaching a €500,000 settlement after a partial court ruling in Heidelberg’s favour.

A spokesperson for the city tells the FT that TFA levels are now “well below” Germany’s recommended drinking water TFA threshold of 60 micrograms, and that experts have ruled out any health risk to the public.

According to court documents, Solvay argued that even the highest concentrations of TFA found in Heidelberg’s water posed no health risk, stating that a person would need to consume hundreds of litres daily to reach harmful levels.

Last year, Solvay announced that it would cease TFA production at all European sites — a decision it attributed to declining demand and “a difficult economic and competitive context”.

But at the plant in Bad Wimpfen, TFA is still being used as a raw material and emitted into the Neckar river, albeit at far lower levels than before.

The main difference is that the chemical is now being imported from China and India. There, too, TFA is seeping into drinking water at high volumes, before making its way around the world through global waterways.

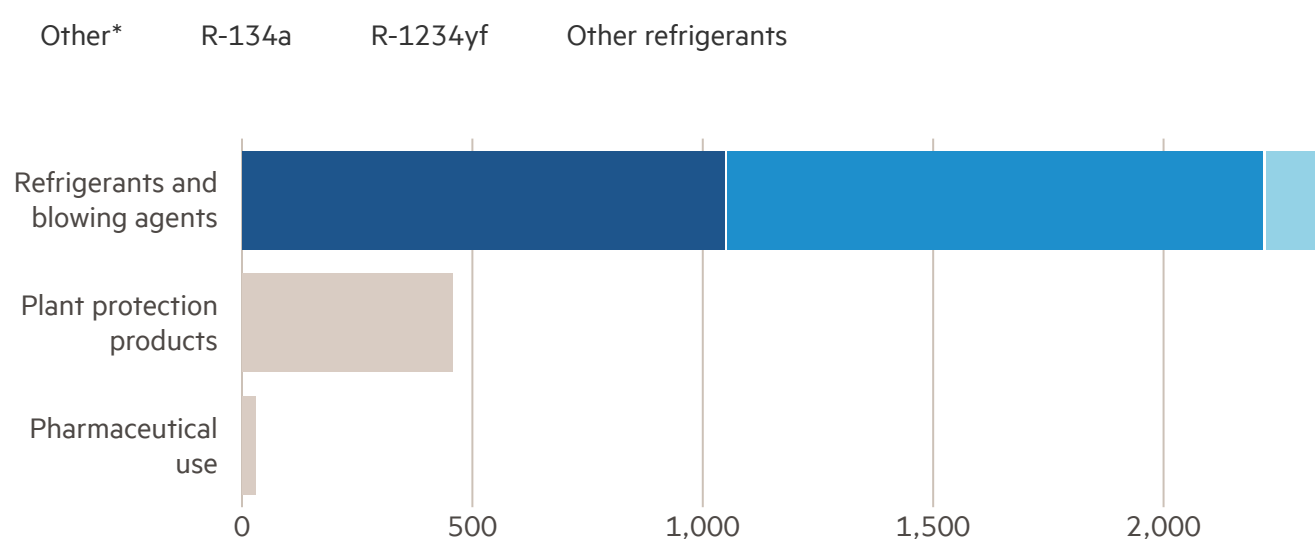
Producers of TFA have complained that they are being made scapegoats, arguing that other emitters — including the automotive, heat pump and agricultural sectors — have largely escaped scrutiny. These do not produce or even use the chemical directly, but it can be generated when other chemicals in their products break down.

A 2021 study by the German Environment Agency estimated that pesticide use in the country releases some 500 metric tonnes of TFA annually — though regulators are still unsure how many products break down into the chemical. The largest source, however, were cooling agents used in heat pumps, refrigerators, and car air conditioning systems, which accounted for around 1,170 metric tonnes per year.

Ironically, the main culprit — the refrigerant r-1234yf — was widely adopted by the automotive industry in the wake of the 1987 Montreal Protocol, which aimed to phase out chemicals destroying the ozone layer.

Refrigerants account for most of TFA emissions

Estimated maximum TFA emissions in Germany, by type (tonnes per annum)



Source: German Environment Agency • *plant protection=flufenacet, diflufenican, fluazinam and other TFA-forming substances
© FT

Other refrigerants, including carbon dioxide, are available, but environmental activists say that car manufacturers are reluctant to use them on cost grounds. “The automobile industry will often say switching to [non TFA-emitting refrigerants] will increase the price of cars,” says Arp. “They need political will or regulatory pressure.”

Some carmakers have taken steps. Volkswagen tells the FT that its new ID.3 model can use carbon dioxide as an “alternative” refrigerant, but declined to answer questions about other models, saying simply that TFA was not “included” in its production processes.

Mercedes-Benz, which took steps to replace r-1234yf in 2016 but later dropped the plan, says its vehicles do not “leak” refrigerant fluids. But the company did not respond to follow-up questions from the FT about the main source of automotive TFA pollution — the release of gases from air conditioning systems into the atmosphere.

Industry lobby groups have fought hard to block further regulation at a time when European industry — in particular the chemicals sector — is already grappling with high energy costs and growing competition.

Executives have argued that the chemical is essential for many processes and cite a UN Environment Programme assessment from 2024 that current concentrations of TFA mean that there is a “de minimis” risk to the environment and human health.

CropLife Europe, a lobby group for pesticide manufacturers, wrote to the European Commission's standing committee on plants, animals, food and feed in December, warning that the ECHA review relied on "assumptions" about TFA's risks and prevalence that were not backed by science and "seem to exceed a fair application of the precautionary principle".

The view is shared by the so-called TFA Task Force, which includes pesticide producers such as the German giants Bayer and BASF. In a letter to European regulators last year, it argued that the Bayer-conducted study linking TFA to eye deformities could well be "rabbit-specific" and said that any regulatory changes made before companies had time to conduct further studies would be unfair.

Bayer, whose products include several pesticides that break down into TFA — notably the herbicide Flufenacet, the first one linked to the chemical by German regulators — has been especially assertive in pushing back.



A passer-by using a drinking fountain in Berlin. There are calls for strict limits on permissible levels of TFA in drinking water © Sean Gallup/Getty Images

When the German Federal Office of Consumer Protection and Food Safety last year tried to ban Flufenacet — a decision upheld by European regulators in March — Bayer sued the agency, which then dropped its attempt.

Bayer argues these "interim legal protection proceedings" confirm that EU member states should not unilaterally ban crop protection products ahead of a final decision by Brussels authorities.

Other chemical companies have also intensified their pushback. When the German Environment Agency began raising questions about TFA in 2016, industry lobbyists tried to have those responsible removed, according to two people familiar with the matter.

One executive of a European company argues that the EU's decision to ban Flufenacet is not only "depriving the region's farmers of a very important herbicide", but adds that it will not move the needle globally. "It's the only major jurisdiction making this decision. The Australians are not; the Canadians are not; the Americans are not."

Another suggests that TFA would continue to spread via waterways from other parts of the world. "The problem is not solved [with stricter regulation in Europe] — it is just shifted," he says.

Fierce opposition from industry has meant EU member states are often reluctant to take action. In ongoing negotiations over a directive concerning which pollutants should be regulated in surface and groundwater, EU diplomats have said that while they are willing to start monitoring PFAS in water sources over the next 10 years, they will only take action on them from 2034.

“The authorisation process for plant protection products [in Europe] will change,” says Banning from the German Environment Agency. But, she adds, there is a long way to go before refrigerants and industrial discharge come under similar scrutiny. “We have to find solutions.”

Whatever the outcome, the European Commission’s decision about how to regulate TFA will be a milestone in efforts to rein in forever chemicals, and will be closely watched.

Andreas Hensel, president of the German Federal Institute for Risk Assessment, stresses that harmful effects on animals have so far only been found “at TFA concentrations significantly higher than those found in the environment”, and insists that European water and food are safe for consumption.



A farmer drives a tractor across a field and sprays pesticides in Rottweil, in the state of Baden-Württemberg. Business leaders warn that Europe’s determination to be a pioneer in limiting pollution will come at a heavy price © IMAGO/Silas Stein/Reuters

But with contamination rising and TFA virtually impossible to remove, he warns that urgent regulation to limit its spread is needed “to ensure this remains the case in the future”.

The EU’s environment commissioner Jessika Roswall has acknowledged that TFA is one of the PFAS found most often in European water and says that she is “committed” to work with member states to push for a clean-up.

While the debate in Brussels drags on, TFA continues to seep into the environment — and human bodies — across Europe and beyond. At stake is not just how far Europe is willing to go to protect the climate, but whether it is prepared to push offending industries out.

One chemical executive warns that, if restrictions go ahead, they could deliver yet another blow to Europe’s already struggling chemical industry. “Europe’s chem parks are like Jenga towers, and everybody is right now taking bricks away,” he says. “Everybody knows that at one point, the game ends.”

The Big Read Sovereign bonds

The mounting pressure on bond markets

For the first time in almost a generation, governments are starting to face regular resistance from investors when they try to sell long-term debt

Ian Smith in London

Published JUN 6 2025

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Auctions of government bonds are usually so routine that they generate little attention. But Japan's sale of 20-year debt last month was an exception.

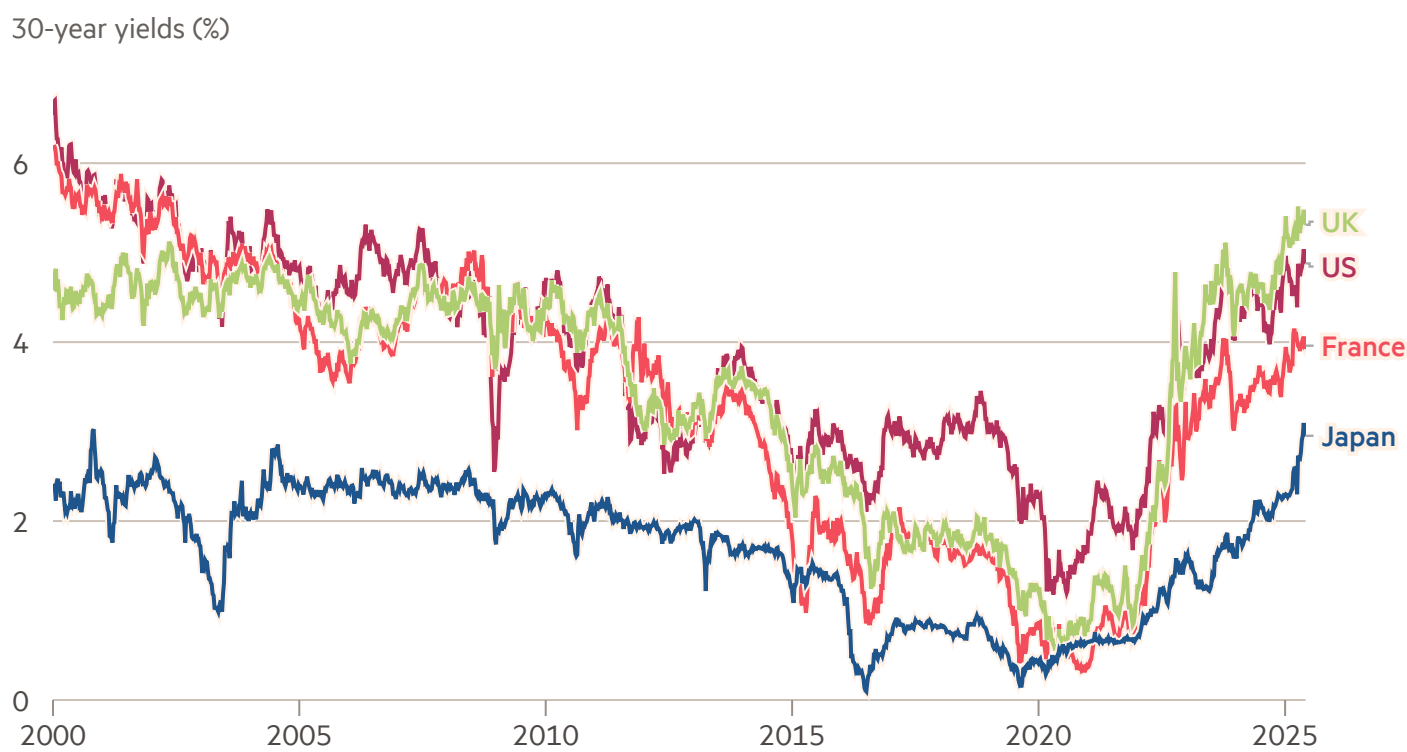
As financial newswires flashed the dismal results around the world, the prices of the longest dated Japanese sovereign bonds dropped sharply, pushing up yields and increasing borrowing costs. An auction of US 20-year bonds the following day also attracted a lukewarm response.

Close attention to the finer details of government bond auctions and higher yields on longer-dated debt are symptoms of the same thing: wobbling investor appetite for such instruments just at the moment when many finance ministries are planning record levels of issuance, and as the world economy enters a new and uncertain era.

For the first time in almost a generation, governments are starting to face resistance from the market when they try to sell long-term debt.

"It's a classic supply-and-demand mismatch problem, but on a global scale," says Amanda Stitt, a fixed-income specialist at \$1.6tn asset manager T Rowe Price. "The era of cheap, long-term funding is over, and now governments are jostling in a crowded room of sellers."

Big economies' long-term borrowing costs have surged



FINANCIAL TIMES

Source: LSEG

The reticence among some investors has taken 30-year government borrowing costs in countries such as the UK, Japan and the US to or near their highest in decades and moved the question of debt sustainability up the political agenda. In many countries, the mounting cost of servicing debt interest threatens to squeeze government spending in other areas.

Rising supply, whether from increased government borrowing, or central banks selling the bonds they purchased in the aftermath of the financial crisis and the Covid-19 pandemic, is coming up against a pullback in demand from some traditional buyers such as pension funds and life insurers.

Indebted exchequers risk becoming more vulnerable to pushback from bond investors. Skirmishes over US trade policy this year and the infamous 2022 gilts crisis that followed the UK's "mini" Budget are a marker of what is to come if public finances are not tightened, investment veterans warn. The ramifications, both for how economies are managed and the outlook for the corporate sector, could be significant and widespread.

"The bond market has never been more powerful, because we've never had so much debt," says Ed Yardeni, the economist who coined the term "bond vigilantes" in the 1980s to describe investors whose activities drove governments to strengthen public finances.

"We have to look at the [debt problem] globally now," he adds, citing rising borrowing costs in the UK, Japan and elsewhere. "The risk is: bond vigilantes of the world unite."

At the heart of the global economy, long-term yields in the \$29tn US Treasuries market have topped 5 per cent in recent weeks, close to the levels reached in 2023 — when investors feared interest rates would have to stay [higher for longer](#) to contain inflation — and before that their highest since the financial crisis.

This is taking place just as a tax and spending bill that could add more than \$2tn to America's debt makes its way through Congress, and amid the continuing fallout from President Donald Trump's imposition of tariffs on America's trading partners.

Some of the leading figures on Wall Street have been sounding the alarm about the country's fiscal position.

Jamie Dimon, chief executive of JPMorgan Chase, warned last week that mounting debts could “[crack](#)” the Treasuries market, prompting reassurances from Treasury secretary Scott Bessent that the US is “never going to default” on its obligations.



Treasury secretary Scott Bessent, left, has tried to soothe market jitters following tariff announcements and criticism from the White House of Federal Reserve chair Jay Powell © Jeff McIntosh/Canadian Press/ZUMA/Reuters

On Thursday, BlackRock chief executive Larry Fink said that if the economy continued to grow at around 2 per cent, “the deficits are going to overwhelm this country”, while Citadel founder Ken Griffin said it was “just fiscally irresponsible” to run deficits of 6 or 7 per cent of GDP while there was full employment.

Elon Musk, the tech billionaire who was until recently a regular fixture in the Trump White House, has described the bill as a “disgusting abomination” and said Congress was “making America bankrupt”.

France’s debt burden was described as a “sword of Damocles” last year by then prime minister Michel Barnier. Europe’s third-largest economy is [expected](#) to spend €62bn on debt interest this year, roughly equivalent to combined spending on defence and education, excluding pensions.

In the UK, 30-year government borrowing costs reached their highest levels since 1998 this year amid investor concerns over the growing debt pile and ministers’ lack of headroom against their self-imposed fiscal rules. Even Germany, a historically reticent borrower with much lower debt levels, is planning to increase Bund issuance.

In Japan, where the central bank’s ultra-loose monetary policy kept long-dated yields below 1 per cent for years, a brutal sell-off has taken them to record highs. The 30-year yield on Japanese government bonds is hovering around 3 per cent.

Finance ministers do have some levers they can pull. Some have switched to more issuance of short-dated debt, where yields are more a function of interest rates and less about supply and inflation dynamics. Central banks could also pause the unwinding of bond holdings built up in the aftermath of crises.

But barring a big step-up in growth, reducing runaway spending is the only durable solution, fund managers say. Craig Inches, head of rates and cash at Royal London Asset Management, says excessive borrowing is the main cause of indigestion in long-term debt markets, forcing tough decisions over cost cuts.

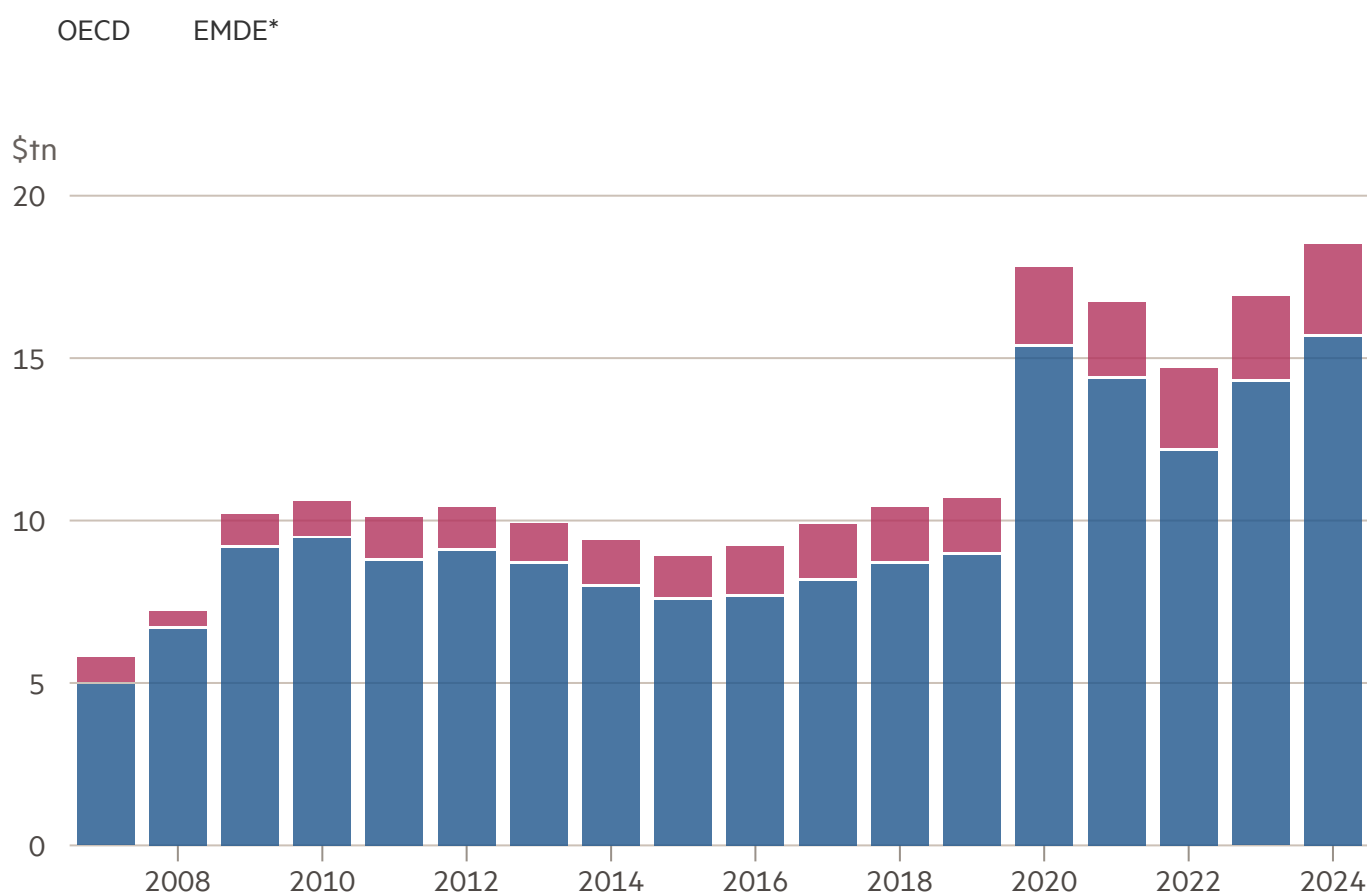
“The question is, do governments have the stomach for it?”

Borrowing costs have been marching higher since the Covid pandemic as inflation rose and central banks reduced their buying. But the recent selling has been especially felt in long-term debt, where prices have fallen faster and yields risen more than in shorter-term bonds.

The yield gap between two-year and 30-year US Treasuries has reached about a percentage point, its highest in three years, with similar steepening elsewhere. Many big fund managers are placing bets that so-called yield curves — which show the cost of borrowing at various bond maturities — will continue to steepen.

High spending since Covid has fuelled record sovereign issuance

Global sovereign bond issuance



FINANCIAL TIMES

Source: OECD, Global Debt Report 2025 • *Emerging markets and developing economies

This is a problem for governments, which issue debt at a range of maturities not only to meet the demands of different investors, but also to spread out their own refinancings and reduce their exposure to swings in market interest rates.

Even with such management strategies, government debt interest costs for the OECD group of rich nations have already reached their highest since at least 2007. In many instances, spending on debt interest exceeds the budgets of big government departments such as defence or education.

Central banks in most big economies are still on a path of cutting interest rates, which has kept short-term rates relatively well tethered. But they have less influence over longer-term borrowing costs. There, investors' expectations for inflation — which can eviscerate the fixed returns offered by bonds — and concerns over excess supply are also critical.

Measures of the so-called term premium, a theoretical measure of the part of the long-term interest rate that compensates investors for this uncertainty, are rising. Most analysts believe that long-term interest rates will continue to climb, helped by investors' "steepener" bets.

Government bond prices also act as a benchmark for corporate borrowing costs, so a deeper problem at the long end of the curve will spill into companies' borrowing costs too.



Bank of Japan governor Kazuo Ueda arrives at a policy-setting meeting in Tokyo last month. Japanese government bond yields have reached record highs after a sell-off in recent weeks © Kyodo/Reuters

"The higher that those rates go, and the less control that central banks have on the long end, the more pressure that puts on the private sector," says Mike Scott, head of global high yield at Man Group.

Questions over demand for long-term sovereign debt have been exacerbated by an exodus of some of the more reliable buyers of this government paper. In the UK, traditional "defined benefit" workplace pension funds have mostly closed to new members and their existing members are ageing — meaning they have less need for long-term debt. Their place is increasingly being taken in the gilts market by hedge funds who want shorter-term bonds.

A similar effect is playing out in Japan, where the country's postwar baby boom generation is ageing and [no longer needs](#) the same level of long-term debt holdings, analysts say.

That has combined with a revival of inflation to fuel a sell-off that has taken Japanese government bond yields to record highs in recent weeks. One of the most reliable bets in the long-term global bond market is fading.

"Governments across the developed world are issuing more debt into the market, just as their anchor, JGBs, becomes untethered," says James Novotny, an investment manager at Jupiter Asset Management.

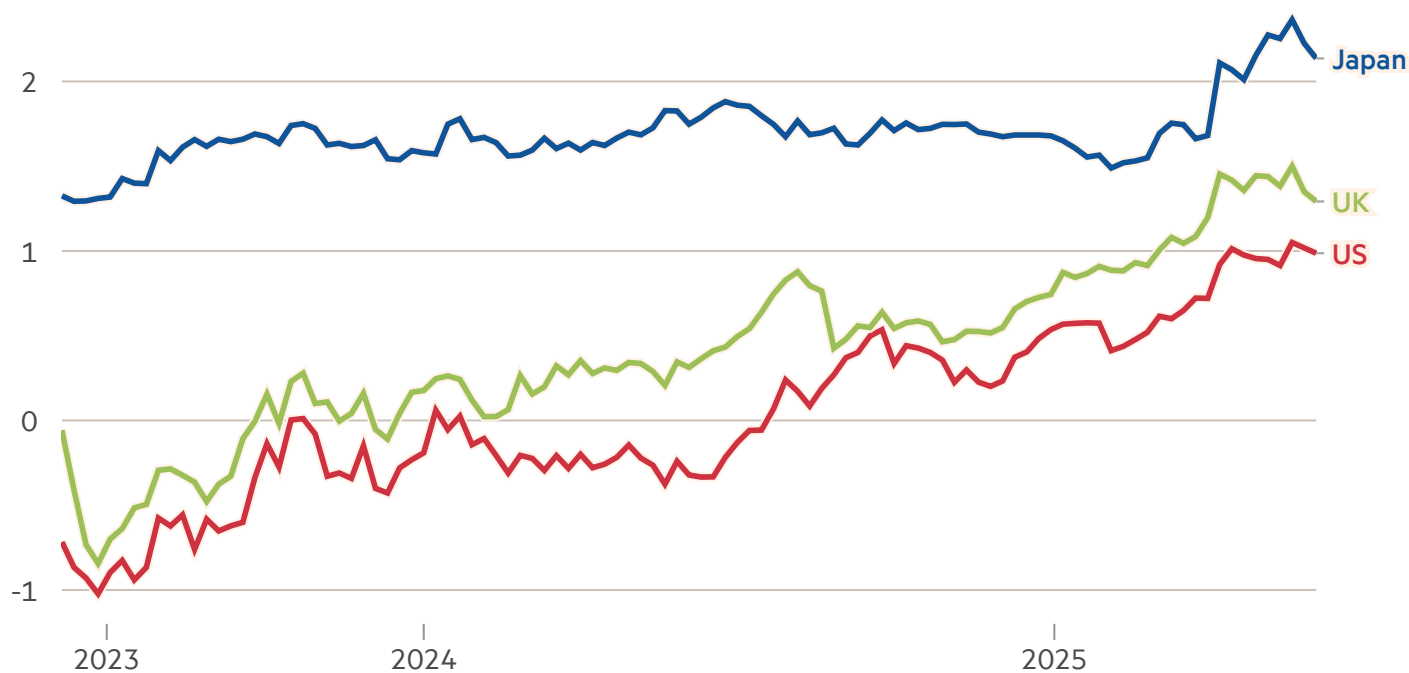
Finance ministers and debt managers have sought to soften the blow from rising market borrowing costs.

The UK's Debt Management Office moved this year to scale back its long-term debt sales, with its chief executive citing the "declining strength" of demand for longer-dated debt and the need to maintain value for money for the taxpayer.

Long-term debt has done especially badly

30-year yields minus 2-year yields

Percentage points



FINANCIAL TIMES

Source: LSEG / FT calculations

In Japan, the government triggered speculation that it would make a similar move when it canvassed the market last month on its [issuance plans](#). There are [precedents](#) for stronger actions: in 2001, the US paused 30-year debt sales entirely.

And in the US, despite Bessent's repeated criticism of his predecessor Janet Yellen for relying more on shorter-term debt issuance, he has said any move to "term out" debt maturities would be "[path dependent](#)" and has suggested instead it could up its buybacks of older debt.

The amount of wriggle room countries have depends on the profile of their existing maturities. The UK is in a relatively healthy position, given that the average maturity in its debt stock is 14 years.

But some investors warn that shortening debt maturities makes countries more susceptible to refinancing risks, a feature more familiar in emerging markets. "[It] won't solve the underlying demand problem, merely pushing it down the curve," says T Rowe's Stitt.

There are other tools. Central banks could also stop or scale back their selling of sovereign debt amassed during previous emergency programmes, so-called quantitative tightening to unwind quantitative easing.



Andrew Bailey, the Bank of England governor, attends a press conference in London. Many view the UK's 'mini' Budget in 2022 as a sign of what is to come if public finances are not tightened © Kin Cheung/AFP/Getty Images

Barclays' Moyeen Islam argued in a recent note that there was "significant merit in a pause in active selling" by the Bank of England, saying it could help lift gilts and have "significant positive consequences for the fiscal outlook". The bank is set to announce in September how much it will sell into the market over the coming year as part of its own QT, although in a letter to the Treasury last month, BoE governor Andrew Bailey said there had been "no evidence of gilt sales having a negative impact on market functioning across a range of financial markets measures".

Central bankers are conscious of the effect of the long-term debt sell-off on monetary policy, too. Catherine Mann, a member of the BoE's rate-setting committee, said in a recent speech that it was "important for a monetary policymaker to consider the interactions of QT and policy rate decisions, especially at a time where these two tools are acting in different directions".

The effects of QT in tightening financial conditions "cannot be perfectly offset" by interest rate cuts, she warned, and "the combination of tools and their macroeconomic effects must be carefully considered".

The path of the public finances in the US, the world's largest borrower, will be crucial to whether the world can work through its glut of long-term debt.

The Congressional Budget Office said on Wednesday that Trump's self-styled "big beautiful bill" would extend the budget deficit and add \$2.4tn to the public debt by 2034.

The US has long been afforded more flexibility than other countries in its public finances, given the dollar's central role in global trade and finance, and the status of Treasuries as the world's reserve asset.

Hemingway described the path to insolvency as 'gradually, then suddenly'. The US is likely to stay on the 'gradually' part... quite possibly forever

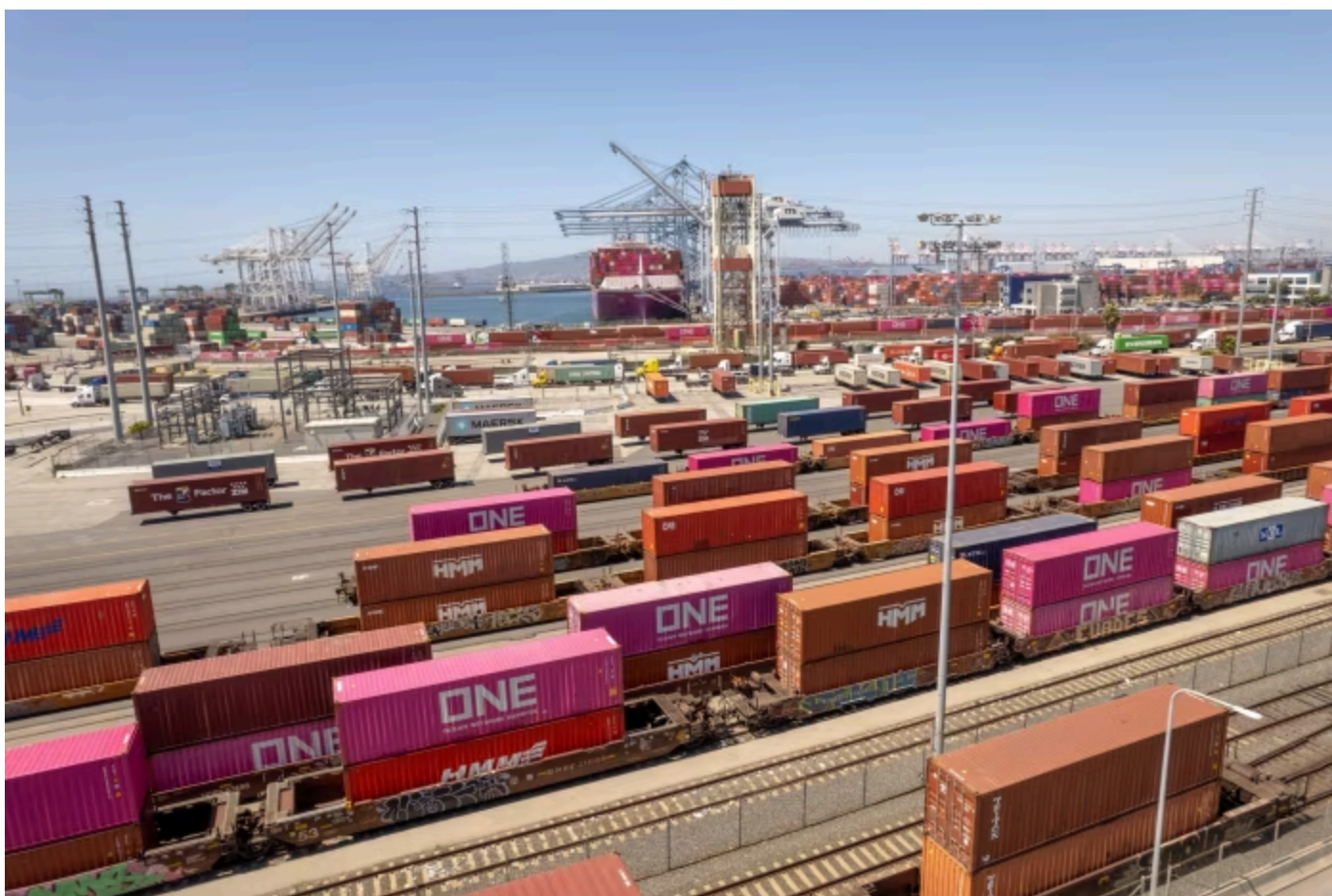
But analysts have increasingly warned that a ramping-up in the country's long-term debt sales, just as global investors are showing signs of diversifying away from dollar assets, could create the conditions for an accident.

The US [lost](#) its last AAA credit rating in May as Moody's warned of its deteriorating debt dynamics. Anxiety is already high in the market after the trade war sell-off in April and Trump's broadsides against Jay Powell, chair of the Federal Reserve, [unsettling](#) big investors' confidence in Fed independence and the implications for long-term inflation control.

The bill is "throwing a little bit more petrol on the fire" of the US debt problems, says April LaRusse, head of investment specialists at Insight Investment, a big fixed-income investor. It "looks pretty bad" in terms of its deficit impact, she adds, "even if you make some kind assumptions" on the revenues that tariffs may bring in.

One concern is that deteriorating debt dynamics in some countries make them less resilient to future surprises or bad political choices. "In a handful of countries, debt is sustainable but vulnerable to new shocks," says Peder Beck-Friis, an economist at bond giant Pimco. He cites the UK and Italy as examples.

In others, such as the US and France — which last had a balanced budget in 1974 — debt looks to be "very unsustainable under the current path" without some degree of consolidation, he argues.



Shipping containers in Long Beach, California. The dollar's central role in global trade and finance has long afforded the US greater flexibility than other nations over its government debt © Kyle Grillot/Bloomberg

Others believe the US and other nations are in the foothills of a debt sustainability crisis. Veteran investor Ray Dalio has warned of a "death spiral" where borrowing costs are forced higher in a self-fulfilling cycle.

But most investors think the US can escape this trap, partly through pressure from the bond market. "Hemingway described the path to insolvency as 'gradually, then suddenly'," wrote Standard Chartered's Steve Englander in a recent note. "The US, in our view, is likely to stay on the 'gradually' part for an extended period, quite possibly forever."

Another option is that countries erode the real-terms value of their debt by tolerating a higher level of inflation than they would have had otherwise. "Effective default through inflation risk could become a material risk," warns Englander.

The danger is that government spending and the need to maintain orderly debt markets become a dominant force for monetary policy, rather than other factors such as economic growth or inflation.

“What I’m really concerned about is that you end up in the fiscal dominance story,” says Bill Campbell, a fund manager at DoubleLine Capital, where increased government borrowing and spending “crowds out” private investment. That, he warns, could lead to a “permanently lower growth trajectory . . . [a] long-term malaise of lower growth, and a massive debt overhang”.

For many investors, the economic ill-effects of the long build-up in sovereign debt are a bigger concern than the more remote possibility of a government bond meltdown in a large economy.

“It’s not our base case that we have a debt blow-up,” says Jamie Patton, a bond fund manager at US investment house TCW. “[But] as a taxpayer and a US citizen, I am deeply concerned,” she adds, depicting a Congress that has progressively “less capacity” to make tax and spending decisions. “We have a big problem on our hands.”

Data visualisation by Ray Douglas

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Solar power

Solar group OCI doubles down on US despite Donald Trump's war on clean energy

South Korean maker of panel cells to invest \$1.2bn in expanding Texas plant as data centres lift power demand



Republican lawmakers have come out against clean energy, with the US House of Representatives passing a tax bill that would gut the industry and end renewable energy subsidies © Getty Images

Song Jung-a in Seoul

Published JUN 7 2025

South Korean solar cells maker OCI Holdings is rapidly increasing production in the US despite President Donald Trump's vow to slash clean energy subsidies, in what the company calls a "once-in-a-lifetime" opportunity to capitalise on power demand from data centres.

OCI, one of the world's largest [solar power](#) developers, plans to invest \$1.2bn to increase the annual cell-making capacity of its plant in Texas to 10GW by 2027 — enough to generate electricity equivalent to 10 nuclear power plants.

Increased [energy](#) requirements by data centres in the US will fuel demand for solar power and South Korean makers could fill the gap, especially as previously dominant Chinese groups are hit with tariffs, said Woohyun Lee, OCI's chair and co-chief executive.

"A lot of big data centres are being built amid the AI boom," Lee told the Financial Times. "We see big growth opportunities in the US given tight energy supply there. There is no other way to meet surging energy demand without solar."

Republican lawmakers, however, have come out against clean energy, with the US House of Representatives passing a tax bill that would [gut the industry](#) and end renewable energy subsidies.

Lee said he was confident the bill would be watered down as it went through the Senate, "because US energy supply will be disrupted significantly otherwise".

But his company would have to reconsider some of its expansion plans if Congress passed the bill in its current form, he said, as a 30 per cent tax credit for commercial projects would be gradually reduced and eliminated by 2031.

OCI is one of the few sizeable solar manufacturers operating in the US that survived a wave of bankruptcies in the 2010s, after China's overproduction of panels dragged prices to record lows and rendered many western operations unprofitable.

The company said it could still benefit from the House bill's restrictions on subsidies for projects that involve any "material assistance" from a "prohibited foreign entity" — a provision that mostly targets sourcing of basic materials from China.

The South Korean group has a polysilicon factory in Malaysia and plans to make wafers in south-east Asia to ship to the US for cell manufacturing.

Helped by cheap panels and subsidies, solar has become the fastest-growing source of new power generation in the US. A record 50GW of solar capacity was installed last year, comprising 84 per cent of new capacity added to the grid, according to consultancy Wood Mackenzie and the Solar Energy Industries Association.

But US solar cell production is far behind the manufacturing of panels, according to OCI, leaving an opening for the company.

Lee said data centre-driven energy demand, heavy tariffs on Chinese imports and generous subsidies from Joe Biden's Inflation Reduction Act had enabled non-Chinese producers such as OCI to compete better with Chinese rivals in the US.

China still produces 85 per cent of the world's solar cells and 79 per cent of polysilicon, the key material in cells. Panels made in China remain significantly cheaper at 10 cents a watt, compared with 30 cents a watt for US-made panels, according to Wood Mackenzie.

Washington has cracked down on imports of solar parts from China and Chinese companies. Biden doubled US tariffs on Chinese solar products to 50 per cent, and Trump has threatened to raise levies by an additional 10 per cent. Polysilicon and wafers from other countries have been exempt from Trump's so-called reciprocal tariffs.

Lee said the industry needed more detailed guidelines on US regulations against foreign entities of concern and a grace period of at least three years to establish a solar supply chain away from China, given its dominance in making panels and wafers.

"Uncertainties have sharply increased with the bill, but the US energy supply market will remain very hot over the next decade," he said.

However, Yana Hryshko, head of solar supply chain research at Wood Mackenzie, said OCI's plans to expand its US plant capacity to 10GW in just two years was "overly ambitious". She expected policy changes to weaken solar demand in the US.

"Building and operating solar cell capacity in the US has proven to be rather complicated," she said. "There is very limited expertise and experience in building an operating solar cell capacity outside of China, and there is a very big difference between building the manufacturing facility and being able to produce qualified products."

Driverless vehicles

Chinese regulators seek to slow rollout of self-driving features in cars

Beijing under pressure to set world-leading safety and liability standards as carmakers power ahead with technology

Edward White in Shanghai and **Gloria Li** in Hong Kong

Published YESTERDAY

The rapid deployment of autonomous driving features on Chinese cars has sparked alarm among regulators in Beijing, who have made the industry tap on the brakes while they assess questions over safety and liability.

Despite an unclear legal framework for new assisted-driving technologies, nearly one in five new cars sold in China is now equipped with high-level autonomous functions.

Beijing officials, caught on the back foot, are expected to slow the rollout as they develop a regulatory framework for the new suite of technologies, where China is rapidly becoming a world leader.

“The cat is already out of the bag; they’re not going to try to put it back in,” said Tu Le, founder of the Sino Auto Insights consultancy. “But what regulators may do is limit use cases for the foreseeable future, until they have a much better understanding of the implications.”

In March, three people were killed in an accident involving a [Xiaomi SU7](#) electric sedan with semi-autonomous capabilities. This fuelled an intense debate online over safety and sparked a warning from Beijing on overzealous marketing of unproven self-driving technologies.






This week, China’s Ministry of Industry and Information Technology proposed the development of new safety requirements for driver assistance systems, a forerunner to driverless cars. New standards aim to reduce accidents and guide technology development, while reducing research costs for companies, according to a notice published online.

While there remains high-level policy support for China’s electric vehicle industry, the central government has not given a clear signal on the timing or scope of broader, nationwide regulations for fully autonomous vehicles, mostly [deferring to local governments](#) to oversee pilot projects.

HSBC analyst Yuqian Ding said Beijing had sought industry “self-discipline” as new regulations are developed. But in the eyes of auto executives in China, she said there was “no longer” a question over whether the technology is needed amid cut-throat competition. “Everyone agrees: ‘If I don’t do this, I’m not going to survive,’” she said.

China’s insurance and transport regulators have traditionally looked to best practices overseas to help form their approach on key rules around liability, such as who bears responsibility for accidents and damage, and how to price insurance.

The progress of autonomous cars

Level of automation		Availability
Level 2 Partial automation	 <p>Speed and steering support; driver must stay fully alert</p>	Widely available in the US, Europe, China and Japan
Level 2+ or 2++ Partial automation	 <p>Advanced features such as lane change signalling and hands-free urban driving</p>	<p>China: Not legally recognised as an official classification, but frequently seen in carmakers' marketing materials</p> <p>US: Available nationwide with Ford, GM and Tesla</p> <p>Europe: BlueCruise approved in 15 countries; BMW approved in Germany</p>
Level 3 Conditional automation	 <p>Vehicle assumes responsibility within its designated operational scenarios; driver is always ready to take over; eyes off in some cases</p>	<p>China: Not widely available, with only a handful of carmakers granted testing licences</p> <p>US: Available in California and Nevada with Mercedes flagship models</p> <p>Europe: Available in Germany with Mercedes and BMW flagship models</p>
Level 4 High automation	 <p>Vehicle can drive autonomously under defined use cases without driver's monitoring</p>	<p>China: Robotaxi commercial deployment in Beijing, Shanghai, Shenzhen, Guangzhou and Wuhan</p> <p>US: Robotaxi commercial deployment in California, Nevada, Texas, Arizona and Georgia</p>
Level 5 Full automation	 <p>Always driverless</p>	Not considered yet

Sources: IDTechEx, Society of Automotive Engineers, Deloitte, FT research

However, with China leading in driverless technology and Beijing insisting on the need to align with its strict data-security controls, the country may be forced this time to develop industry-wide regulations ahead of other jurisdictions.

The development of a new legal framework faces further complications from the likelihood of a years-long transition, when there will be a mix of human drivers and fleets of robot cars transporting people and goods.

Sam Radwan, principal at Enhance International, a consultancy advising Chinese insurers, predicted that a final insurance system for increasingly smart cars could still be five or 10 years away.

There was a fundamental problem, he said, in deciding how to price risk and allocate responsibility when a vehicle’s operating system was frequently downloading software updates. They potentially changed a vehicle’s capabilities and the level of attention and interaction required by a driver.

However, “statistically, driverless cars are going to crash less than cars driven by people, so premiums for the auto industry are likely to, over time, be reduced”, said Radwan. “But it’s a messy period getting there.”

The patchwork of current rules on liability implies that, with Level 3 vehicles, which can manage complex scenarios but require drivers to be ready to take control upon a system prompt, responsibility is shared among drivers, insurers and automakers.

At Level 4 — full self-driving in specific conditions in vehicles such as robotaxis — accident responsibility is expected to sit with fleet operators. Yet there are still questions over whether hardware and software suppliers should also be held liable.

In an industry where the US and China are competing for supremacy, regulatory questions are also emerging in America, such as whether Cybercabs developed by Elon Musk’s Tesla would be allowed to drive on American roads without pedals or a steering wheel.

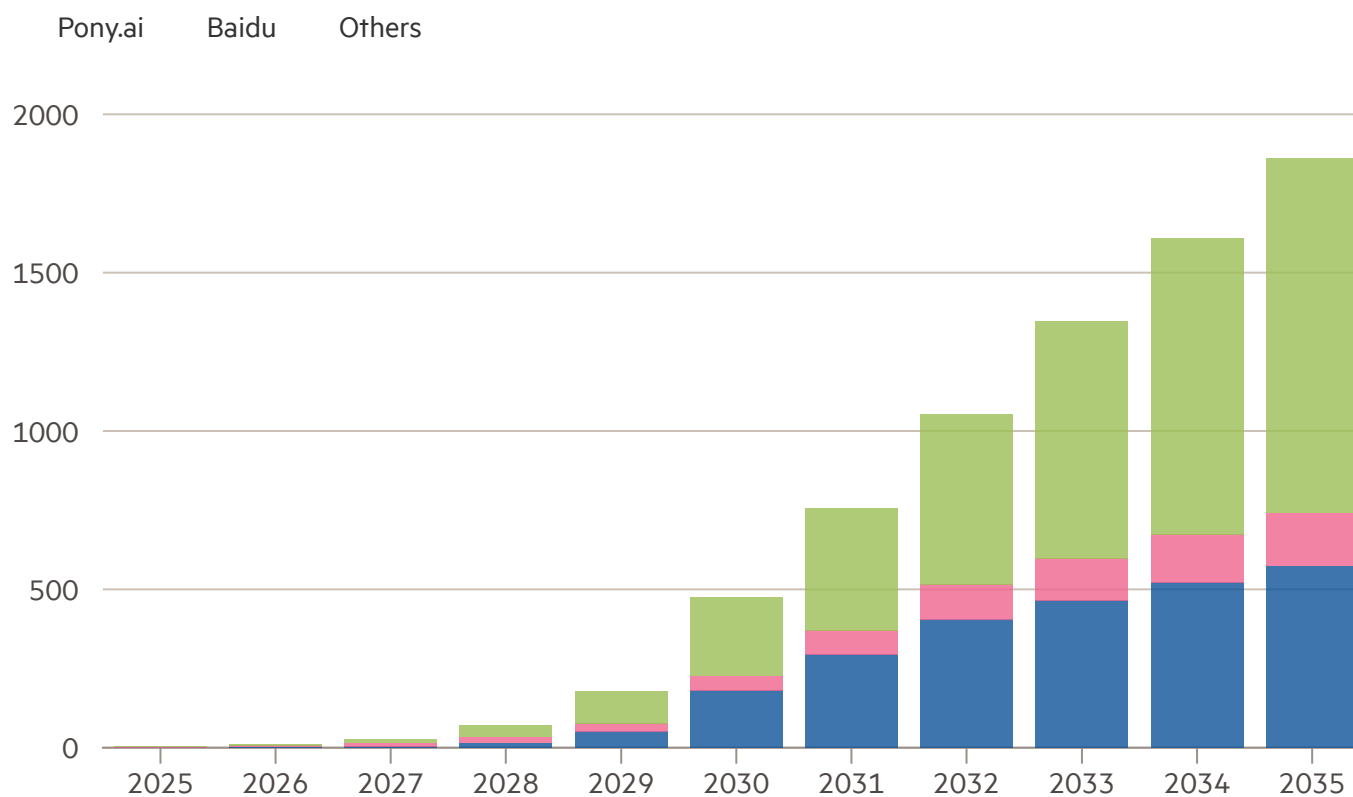
Lei Jun, founder of smartphone giant-turned-carmaker Xiaomi, is among those who have urged the government to adopt a new nationwide safety testing and verification system for autonomous vehicles, as well as a compulsory insurance system for the new breed of cars.

Paul Gong, who leads China automotive analysis at UBS, said there might still be merit in the lack of clarity in China at this stage of the industry’s development.

“Excessive regulation can hinder technological development, as we’ve seen in Europe and the US. It’s more important to let engineers drive progress rather than letting lawyers manage it.”

China's robotaxi fleet is estimated to reach nearly 1.9mn by 2035

Estimated volume (1,000 units), by company



Source: Goldman Sachs

Autonomous driving pilot zones have been approved in about 20 Chinese cities, including large-scale robotaxi tests in Beijing, Shanghai, Shenzhen, Chongqing and Wuhan.

Goldman Sachs has forecast China’s robotaxi fleet would pass 500,000 cars over the next five years, while it expects the Chinese robotaxi market to be worth \$47bn by 2035, up from just \$54mn this year.

James Peng, chief executive of Chinese robotaxi start-up Pony.ai, said while there appeared to be a “clear road map” for expanding the operational regions for the L4 vehicles, regulations over L3 were a “grey area” and “even the product definition is still not very clear”.

Ya-Qin Zhang, who chairs the Apollo alliance, an open autonomous driving platform led by search group Baidu, is more sanguine about the regulatory outlook. He believes the current approach seeks to “balance safety and innovation”.

Zhang, who also leads the Institute for AI Industry Research at Tsinghua University, described 2024 as “explosive” for the development of true driverless technology in China, thanks to the coupling of mass data collection from the pilot zones and new powerful AI applications that allowed faster training for driverless cars and helped them to reason and react in a more human way.

He expects that by 2030, about 10 per cent of China’s new cars will have the capability to be operated without a driver. And by that time, the regulatory framework will be ready.

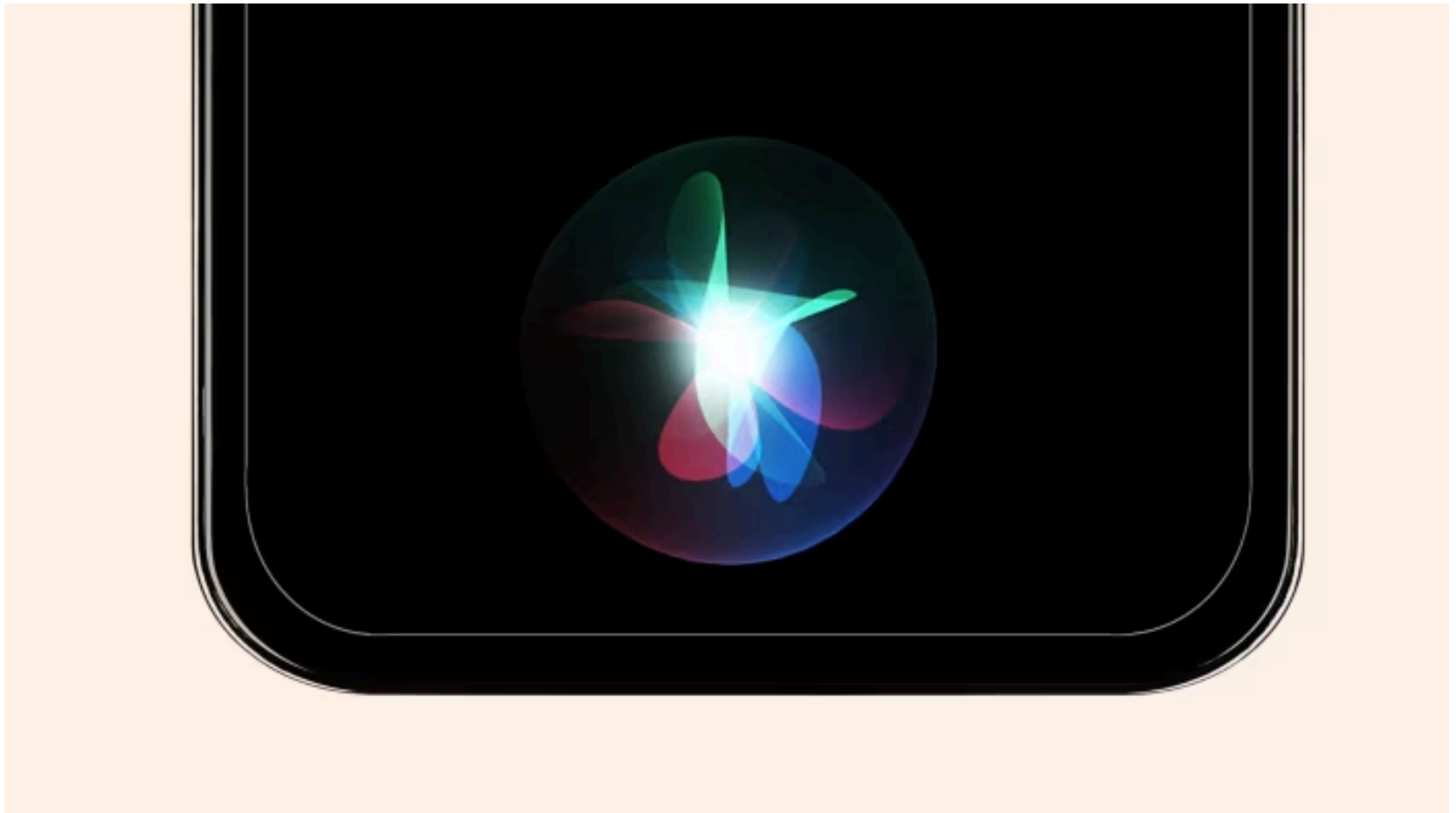
“We need cars to learn how humans drive,” Zhang said. “The [pilot zones] collect a lot of human driving behaviour.”

Additional reporting by Kana Inagaki in London

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Apple Inc**Apple's struggles to update Siri lead to investor concerns over AI strategy**

iPhone-maker hit by technological challenges that have led to delays to the full rollout of its 'Apple Intelligence' features



© Alex Wheeler/FT montage/Getty Images

Michael Acton in San Francisco

Published YESTERDAY

Apple is struggling to deliver upgrades to its artificial intelligence voice assistant for the iPhone, with investors downbeat about the potential for major AI announcements at its flagship annual event next week.

Recently departed employees told the Financial Times that the Silicon Valley giant has been hit by challenges with updating Siri using cutting-edge large language models that can deliver more sophisticated responses to spoken prompts.

Apple has been attempting to build its own LLMs over the machine learning technology that currently powers Siri, a product already used in hundreds of millions of its bestselling devices, with the aim of creating a truly conversational assistant.

Former executives said that the process of integrating the technologies has led to bugs, an issue not faced by competitors such as OpenAI which have built generative AI-based voice assistants from scratch.

One former Apple executive said: "It was obvious that you were not going to revamp Siri by doing what executives called 'climbing the hill'," meaning to incrementally develop the product rather than rebuilding it from the ground up.

"It's clear that they stumbled," the person added.

The updates to Siri form a key part of “Apple Intelligence,” a suite of AI features announced at the company’s Worldwide Developer Conference last year and intended to boost hardware sales.

The FT [reported this week](#) that Apple’s attempt to rollout the AI features in China, powered by models made by Alibaba, is being held up by a Beijing regulator. Sensitive deals in the country involving American tech companies have come under closer scrutiny in response to US President Donald Trump’s trade war.

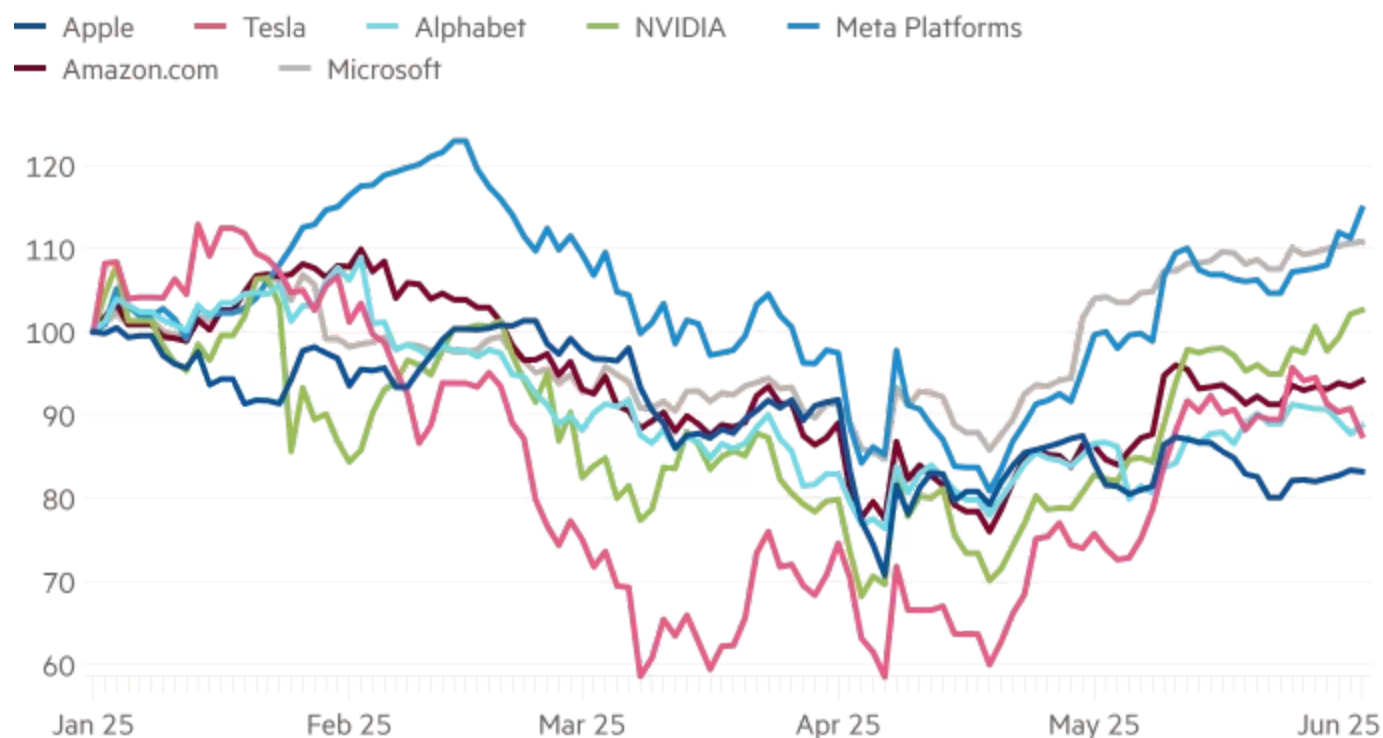
Repeated failures to release Apple Intelligence features that have already been announced has meant expectations are low for this year’s WWDC, which kicks off next week.

“We’re at the point where investors already know what the good news potentially is, and it’s about: let’s first have you deliver what you promised last year,” says Samik Chatterjee at JPMorgan.

The AI struggles have weighed on the tech giant’s stock. It has been worst-performing of the so-called Magnificent 7 tech stocks in 2025, down around 18 per cent since the start of the year and below the tech-heavy Nasdaq which is largely flat.

Apple is the worst performing Mag 7 stock this year

Share prices rebased



Source: LSEG via markets.ft.com

Trump’s tariffs, competitive threats in China, and legal pressure on Apple’s high-margin services business have also led to investor concerns about its long-term growth.

At the core of Apple’s AI troubles is Siri, its legacy voice assistant which is seen as critical to unlocking true “agentic” abilities on the iPhone and other Apple devices.

When ChatGPT launched in late 2022, “the way companies were doing conversational interaction was changing rapidly, and it was clear Siri was coming up short,” said another former senior Apple employee who worked on the technology ahead of the launch.

The person added that they were “surprised” to see features announced last year that were ultimately “not going to make it” in time for Apple Intelligence’s initial release.

As well as operating much larger and more powerful models, the likes of OpenAI, Google and Perplexity all have launched voice assistants that are widely viewed as smarter than Apple’s.

The iPhone-maker’s answer was to focus last year’s annual developer conference on its own AI push, where it teased an AI-upgraded assistant able to read the user’s screen, draw on their contextual information and take actions within their apps.

A group of AI features such as writing aids, image and emoji generation and camera-based search have already hit the market.

The heralded changes to Siri are yet to be released, however. Chief executive Tim Cook recently admitted the technology did not meet the company's "high quality bar" and was "taking a bit longer than we thought."

The delays led to Apple pulling TV ads featuring *The Last of Us* star Bella Ramsey that promoted the new Siri update. The company drew a number of false advertising lawsuits from consumers.

The current delays to Siri mean that Apple is essentially three years or more away from delivering "a truly modern AI assistant, long after Google and others have integrated such tech," Bank of America analysts wrote on Monday.

The failures have led to changes at Apple. John Giannandrea, its AI guru poached from Google in 2018, saw the Siri product division removed from his remit earlier this year and transferred to Mike Rockwell, the executive behind the Vision Pro headset.

A former Apple executive said that fragmented leadership teams led to a lack of a unified strategy around AI, made worse by an initial lack of appetite on the part of top executives to allocate a big enough budget for the build-out of the technology.

Another challenge is Apple's focus on user privacy and security. It has prioritised running its AI features through smaller models and user data staying on the device, which former employees said adds another layer of complexity to the challenge.

This stands in contrast to larger LLMs such as those that power OpenAI's ChatGPT, which run through the cloud on powerful servers. Apple has leaned on OpenAI by releasing ChatGPT integration with Siri.

Since then, OpenAI has [signalled its own ambitions](#) in the hardware space, with chief executive Sam Altman announcing a \$6.5bn deal to acquire IO, the company founded by former Apple designer Jony Ive, who will now be creating products for a potential rival. Apple shares fell about 2 per cent on the news.

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