

CentrePiece

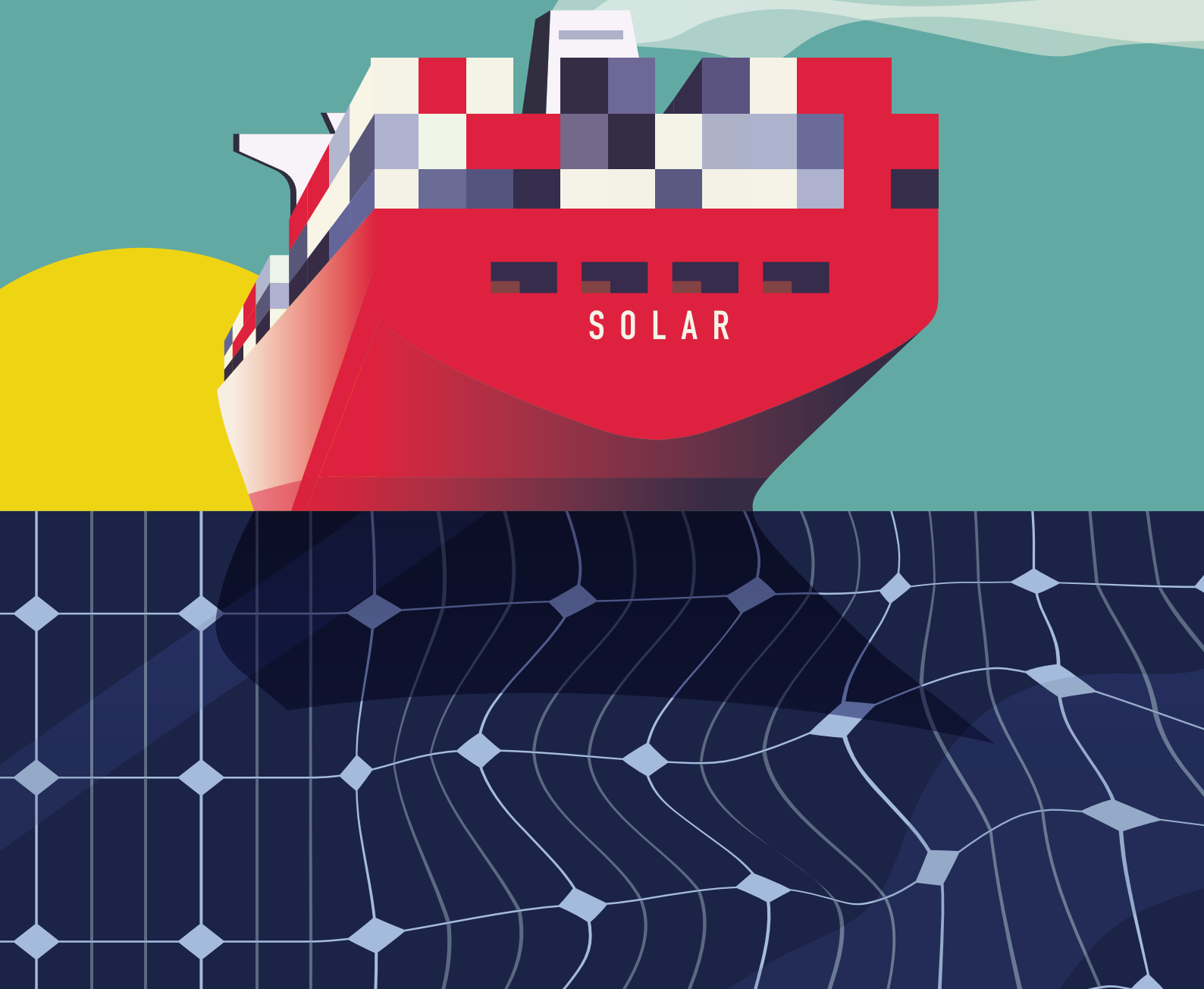
The Magazine of The Centre for Economic Performance

Volume 30 Issue 1 Spring 2025

Daniel Kahneman, Nobel laureate
Women inventors
Online doctors

The UK's car industry
Interviewed by AI
Brexit damage

CHINA'S SOLAR POWER



CentrePiece



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Editorial

The Nobel Prize-winning psychologist Daniel Kahneman, whose research with Amos Tversky launched behavioural economics, was a longstanding friend of the Centre for Economic Performance (CEP). Indeed, when Paul Dolan, Richard Layard, Gillian Tett and Barbara Tversky shared their stories of his life and work at a CEP event last term, his generosity and kindness were remembered as much as his intellectual contributions. Barbara Tversky, who spoke of her privilege to have a “front row seat” to the way he worked, has now written exclusively for *CentrePiece* about the “many Dannys” that she knew: the psychologist, the optimist and the constant learner. He was, she writes, a man who “never stopped having ideas”.

Our cover story deals with some of the most pressing decisions that economies face – how to cope with globalisation, technological advances and climate change. Donald Trump’s return to the White House has turbocharged the

conversation, but politicians in the United States and Europe have faced the trade-offs between short- and long-term impacts for at least the last 20 years – balancing the demands of Chinese competition, reducing emissions and protecting jobs.

As the need for rapid action on climate change becomes ever more urgent, should the balance shift? Pia Andres looks at how European companies producing solar energy have fared since 1999. She concludes that as government support needs to show benefits for domestic firms, supporting their research and development rather than putting barriers up to imports may be the best way to do this, and to accelerate crucial innovation.

New technology is also the subject of an entertaining read by Ruveyda Nur Gozen. She tells the story of Josephine Cochrane, the inventor of the dishwasher, illustrating how changes to property laws in 19th century America created powerful

incentives for women inventors, making all our lives easier.

How to realise the benefits of the latest technological revolution – artificial intelligence – is already a hotly debated issue. The possibilities will be one of the big discussion points at the 2025 LSE Festival, themed “Visions for the Future”.

One benefit of AI for researchers explained here by Friedrich Geiecke and Xavier Jaravel could be in aiding qualitative studies. They have created a chatbot that makes doing surveys quicker and easier. According to some respondents, the technology is preferable to its more judgmental human counterparts when asking about sensitive issues. It seems that while intelligence is important, what we really value is kindness – whether in people or in bots.

Helen Ward, Editor
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empower women
inventors

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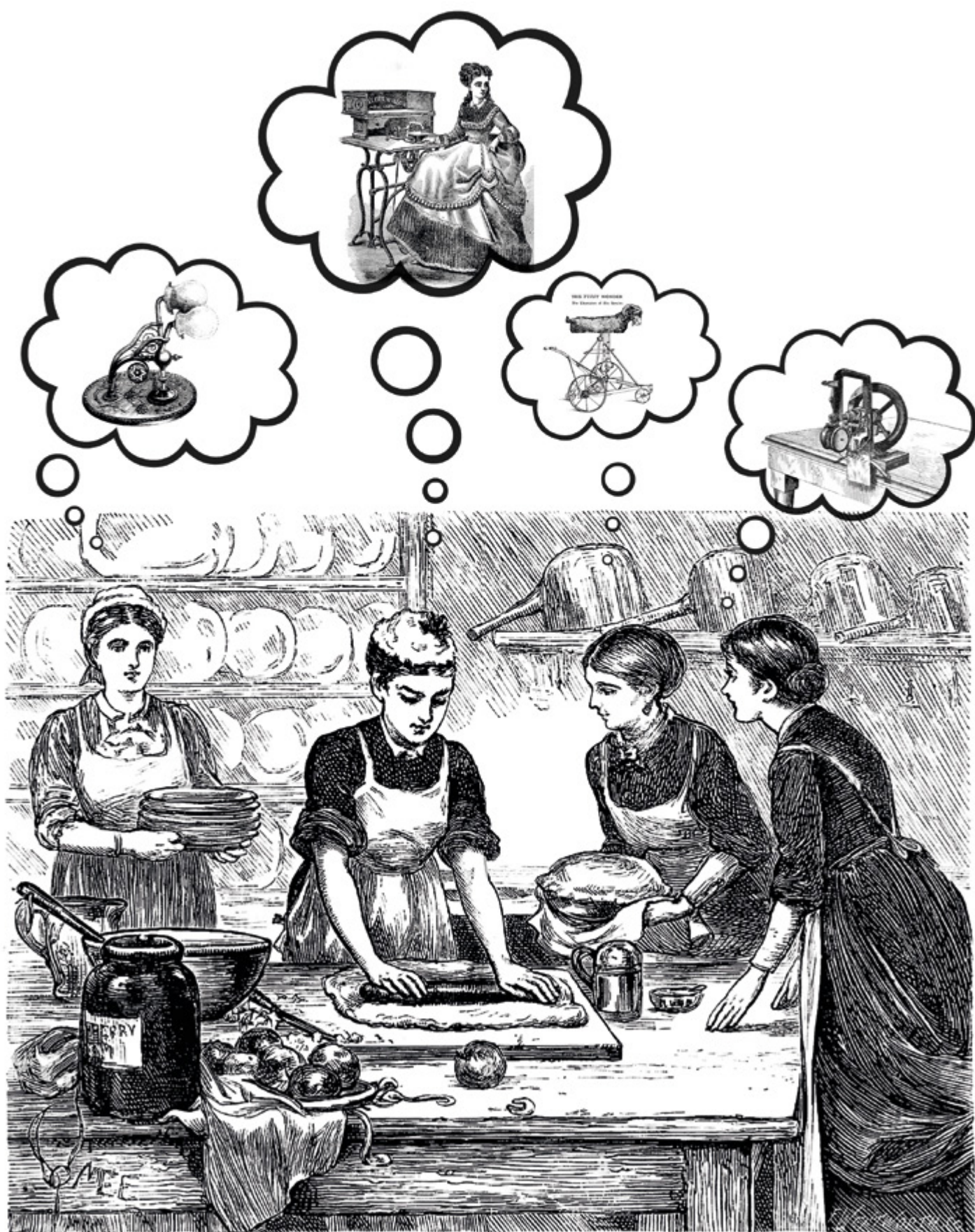
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Remembering Daniel Kahneman





Breakthrough innovations occurred when women obtained the right to reap economic rewards from their inventions. **Ruveyda Nur Gozen** shows how such inclusive policies are a critical driver of economic growth.

Property rights empower women inventors

The under-representation of disadvantaged groups as innovators and entrepreneurs is a global challenge. This is particularly true of women. Despite making up half the population, they consistently participate less than men in entrepreneurial activities and produce fewer innovations. In some societies, women still face significant barriers, such as lacking the legal rights to run businesses independently, to own property or even to travel without their husbands' consent.

What difference to more inclusive economic institutions for women make to women's participation in innovation and overall innovation activities? And how does this influence the direction of technology and contribute to the overall dynamism of an economy?

Women's entrepreneurial rights in the 19th century

In the 19th century, women in the United States were not recognised as independent economic actors. This meant that their skills were largely confined to contributing to family income through household

production, such as baking, farming, managing livestock or making clothing. Marriage further restricted their rights, including the ability to own or control any property or to operate a business – rights that were instead held by their husbands.

In addition to tangible property such as houses and farms, women also had restricted rights to make use of intangible property independently, including patents, which convey the right for their owner to make or market an invention exclusively.

Although women were legally allowed to apply for and get patents for their inventions, they faced significant barriers in leveraging these patents economically. Women were often unable to sue for infringement, to run a business independently or to capitalise fully on the economic advantages of their patents. This lopsidedness – where women could patent but not effectively protect or monetise their inventions – substantially reduced the economic incentives and returns associated with entrepreneurial and innovative activities.

The importance of well-defined property rights cannot be overstated.

Securing the right to maintain monopoly rents from inventions – enabling the patent-holder to be the sole supplier of their product for a certain amount of time – is a powerful incentive to patent new innovations.

Anecdotal evidence highlighting the challenges of property rights for women during the period can be found in newspaper archives, where journalists documented the problems that women faced in case of getting a patent:

US states that reformed their property rights laws in the 19th century saw a big increase in innovations by women

Legal reforms gave women new economic incentives and rights

In the second half of the 19th century, states started enacting the Married Women's Property Rights Act, a pivotal legal reform that drastically altered women's property rights. These laws allowed women to own and control property, to enter contracts, to engage in business and to retain their labour and capital earnings independently. Crucially, these rights applied regardless of a woman's marital status, enabling them to use their assets as they saw fit.

These legal reforms opened new avenues for women to contribute to technological progress by providing economic incentives and rights that had previously been inaccessible. But how can we measure innovations?

While not all innovations are patented, patents serve as a widely used data source for economists to gauge innovative activity. In my research, I used the Comprehensive Universe of US Patents (Berkes, 2018), which is one of the richest patent datasets. Since gender information is not available in patent data, women inventors are identified based on name identification, using popular male and female names from the 19th century.

When comparing women in states that adopted these property rights laws to those in states that did not, we see a significant increase in innovations by women, without displacing those by men. This suggests that including a previously disadvantaged group in the innovation process not only boosts innovation within that group but also contributes to the overall volume of innovations in the economy.

Moreover, women were just as innovative as men in terms of breakthrough innovations – those that differ most from previous patents in terms of textual content and have a greater influence on subsequent patents (Kelly et al, 2021). On average, one out of five patents by women represented novel ideas that departed from previous inventions and influenced future inventors over the following decade.

Women and household innovations

So what did women invent during this period, and in which directions did their technological contributions flow? Based on our historical assumptions of social norms

a married woman is not reconized by law as possessing full right to the use and control of her own powers. Should she obtain a patent she would not be free to do as she pleased with it —would "possess no legal right to contract with or to license any one to use her inventions." Moreover, should her right be infringed she could not sue the offender.

Source: The New York Times; Apr 22, 1883, pg. 5.



Source: United States Patent and Trademarks Office.



One in five patents by women represented novel or breakthrough innovations

and gender roles, we might expect women to have focused primarily on innovations related to textiles or clothing. But when we examine the type of technologies patented, we find that women were more actively involved in innovations related to household appliances – areas requiring knowledge of mechanical engineering – such as dishwashers, refrigerators, ovens and more.

Even more notably, the share of breakthrough innovations in fields like human necessities, physics and mechanical engineering by women was comparable to that of men. This diversity in women's innovations challenges traditional assumptions and highlights their significant,

yet often overlooked, role in advancing a wide range of technological fields.

Women inventors, benefiting from the better property rights, could gain wealth, reputation and even social status. Josephine Cochrane was one of those women, the inventor of the first successful dishwasher, patented in 1886. She was born in 1839 in Ohio to an inventor and engineer father and was the granddaughter of an inventor of the first steamboat. But she could not pursue higher education, got married when she was 19 and had two children. After her husband passed away in 1883, she inherited a huge debt and had no income.

Cochrane was 45 years old when she invented the dishwasher. She also

presented her work and won an award at the World's Columbian Exposition in Chicago in 1893. After her successful invention, she established Cochrane's Crescent Washing Machine Company to produce this machine. As demand for her invention grew, she became very successful. Her company later became part of KitchenAid brand, owned by the Whirlpool Corporation.

This story of business success through innovation exemplifies the importance of revealing hidden talents in an economy with more inclusive institutions and economic incentives. Here, an idea transformed into an invention, a patent and a corporation that not only generated employment and an income stream but also influenced future inventors.

The importance of education and a level playing field

My findings highlight several broader implications for understanding who became an inventor as a result of these more inclusive institutions. I observe that 19th-century women inventors had higher levels of education compared to non-inventor women, suggesting that human capital accumulation was a significant channel for innovations in an environment where intellectual property and innovative activities were rewarded with well-defined property rights.

These findings align with contemporary studies, which suggest that higher levels of education are essential for creating innovations (Toivanen and Väänänen, 2016; Akcigit et al, 2024). In addition, the right to own property independently of their husband further allowed women to accumulate more wealth that could alleviate financial restrictions that inventors may face as innovations are often risky investments.

Second, creating an even playing field by eliminating social, economic or institutional barriers offers a vital opportunity to uncover hidden or lost talents within an economy. The fact that

the majority (almost 60%) of women inventors were married highlights the significance of the right to own property independently and the potential impact of compulsory education policies for children, which can provide further support for women's participation in innovation.

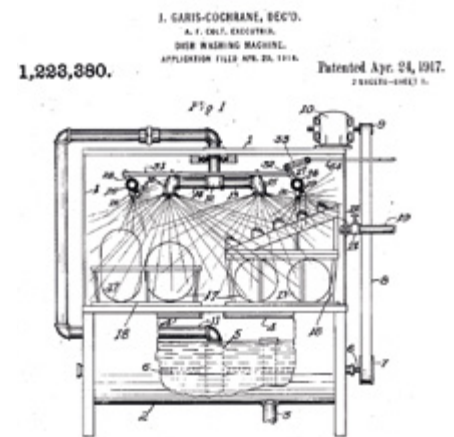
It is important to note that persistent gender inequality, norms and racism during this period might also have affected who became an inventor. A recent study finds far lower patenting rates among Black Americans in the South compared with those in the North (Andrews and Rothwell, 2023). Therefore, the impact of property rights could be weaker for Black women due to racial discrimination, marginalisation and a lack of institutional trust.

This is supported in my analysis, which finds that almost 99% of women inventors were white in the 19th century, suggesting that property rights reform did not have the same effect for Black women compared with white women in the 19th century.

How property rights reforms can drive innovation

The study of women's property rights in the 19th century provides valuable insights into how legal and economic reforms can drive innovation. By granting women the right to own and control property, the Married Women's Property Acts not only empowered women, but also led to significant increases in both the quantity and quality of innovations. This historical perspective emphasises the importance of inclusive policies that offer equal opportunities for all individuals to contribute to economic progress and technological advancement.

As we continue to strive for a more equitable society, the lessons from the 19th century remain highly relevant today. Ensuring that disadvantaged groups have the rights and resources necessary to innovate is not just a matter of fairness but also a critical driver of economic growth and technological progress.



This article is based on 'Property Rights and Innovation Dynamism: The Role of Women Inventors' by Ruveyda Nur Gozen, CEP Discussion Paper No. 2005 (<https://cep.lse.ac.uk/pubs/download/dp2005.pdf>). An earlier version appeared as 'Studying Women's Property Rights in the 19th Century Can Help Uncover the Missing Inventors' on *LSE USAPP*. (<https://blogs.lse.ac.uk/usappblog/2024/08/15/studying-womens-property-rights-in-the-19th-century-can-help-uncover-the-missing-inventors/>).

Ruveyda Nur Gozen is an assistant professor of economics at Cardiff Business School and a research associate in CEP's growth programme.

Further reading

Ufuk Akcigit, Jeremy Pearce and Marta Prato (2024) 'Tapping into Talent: Coupling Education and Innovation Policies for Economic Growth', *Review of Economic Studies*.

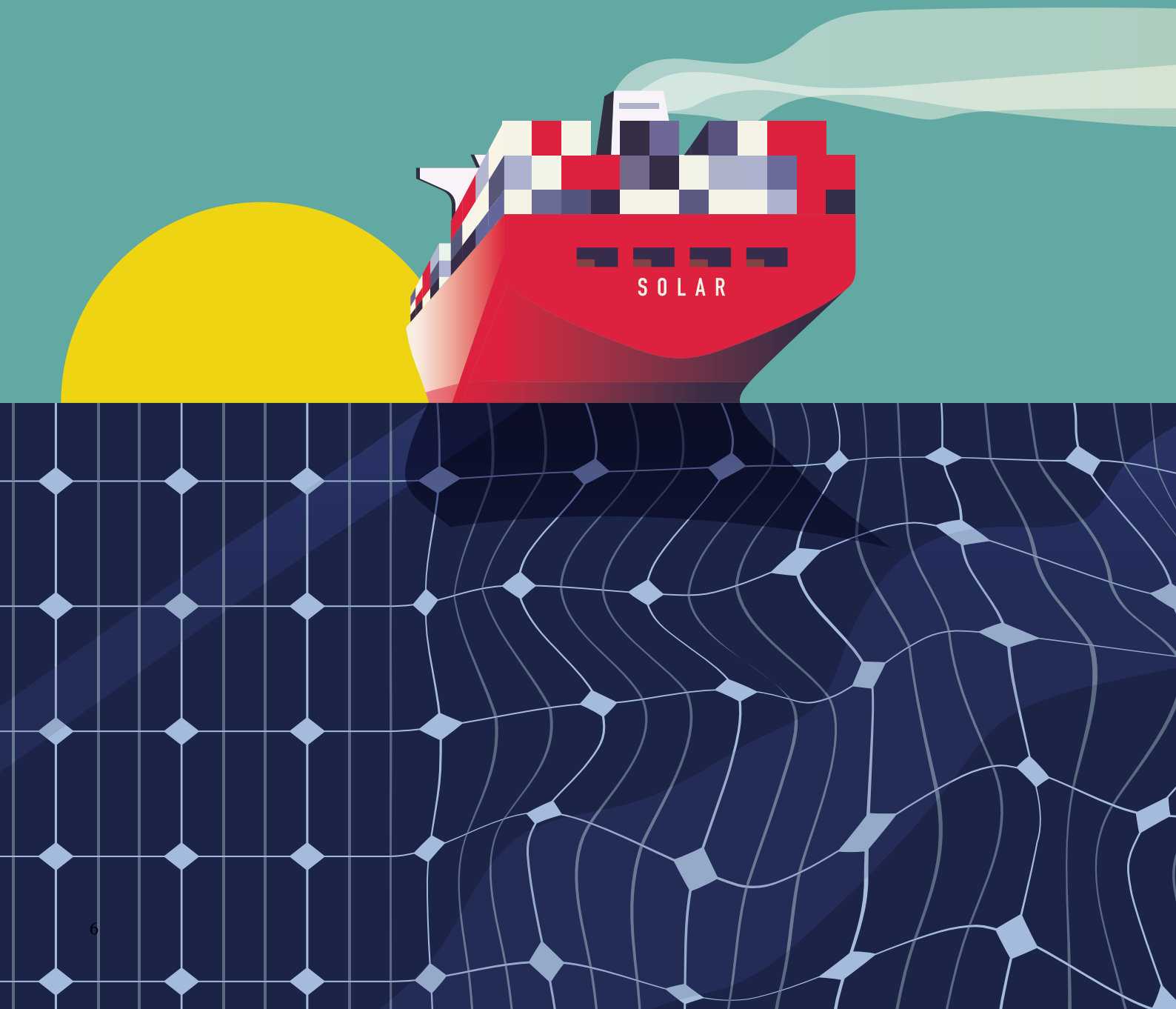
Michael Andrews and Jonathan Rothwell (2023) 'Reassessing the Contributions of African American Inventors to the Golden Age of Innovation', available at SSRN.

Enrico Berkes (2018) 'Comprehensive Universe of U.S. Patents (CUSP): Data and Facts', working paper, Ohio State University.

Bryan Kelly, Dimitris Papanikolaou, Amit Seru and Matt Taddy (2021) 'Measuring Technological Innovation over the Long Run', *American Economic Review: Insights* 3(3): 303-20.

Otto Toivanen and Lotta Väänänen (2016) 'Education and Invention', *Review of Economics and Statistics* 98(2): 382-96.

Women were actively involved in innovations related to household appliances – areas that required knowledge of mechanical engineering



Should policymakers protect European firms by restricting imports of solar technology from China? **Pia Andres** finds that Chinese competition has resulted in many European firms going out of business, but it has also prompted more intense innovative activity among some of those that have survived.

How China's rise has shaped innovation and exit among European solar firms

Renewable energy is key to enabling the transition to a low-carbon economy. It should therefore be good news that the cost of generating electricity from solar power has declined dramatically in recent decades, exceeding even the most optimistic forecasts and enabling the energy source to compete effectively with fossil fuels.

Solar power has undergone a dramatic evolution since its conception in the 1950s. Its cost has declined by a factor of almost 100 since then, making it a unique historical example among energy technologies (Nemet, 2006). Solar is now widely regarded as the poster child for successful green technology innovation enabled by government support.

Figure 1 plots the evolution of the global average levelised cost of electricity

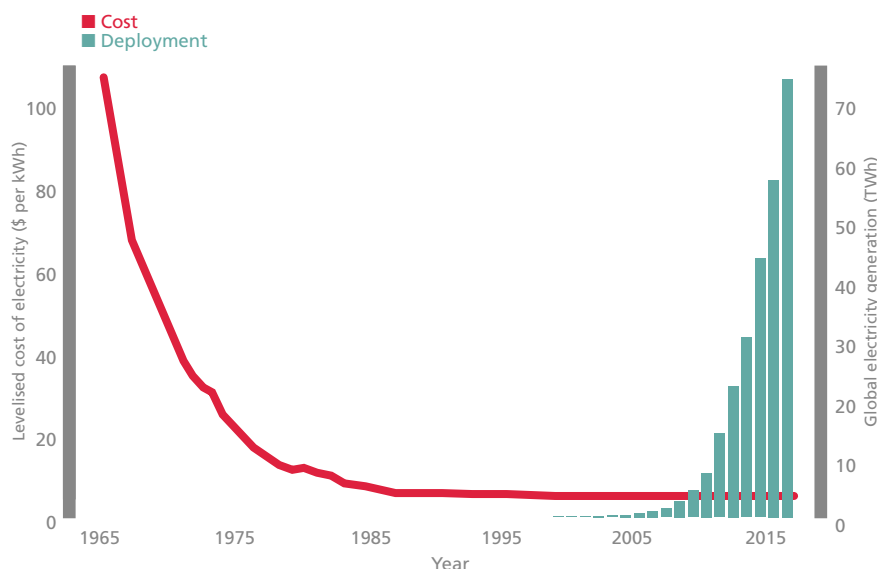
and global electricity generation from solar photovoltaic (PV) technology between 1965 and 2016. This illustrates the dramatic fall in costs over time, as well as a rise in deployment starting in the early 2000s.

While policy-supported improvements to productivity through learning-by-doing and technological innovation – as well as other factors such as lower material costs – have contributed significantly to the success of solar PV technology, the growth of low-cost manufacturing in China, with its associated economies of scale and intensified global competition, have also played a central role.

The energy sector is responsible for two-thirds of global greenhouse emissions (Gielen et al, 2019). While one might expect cheaper low-carbon energy to be

Many European solar firms did not survive the China shock – but of those that did, some innovated more intensely

Figure 1:
Trends in the cost and deployment of electricity generated from solar technology.



Note: The levelised cost of electricity is the average cost per unit of electricity generated over the entire lifetime of an energy-generating asset. The figure plots the global levelised cost of electricity from solar PV in US dollars per kilowatt hour (kWh) over time on the left axis in the red line against global solar PV electricity generation in terawatt-hours (TWh) (right axis, green bars).

Source: Andres, 2024.

Solar power is now almost 100 times cheaper than it was in the 1950s

universally welcomed, given the urgency of avoiding catastrophic climate change, China's dramatic rise to dominance in the solar sector was met with anti-dumping tariffs by the United States in 2012. The European Commission followed suit by imposing tariffs in 2013, later agreeing on a minimum price and limited import volume with China.

Chinese competition and the European solar sector

In both the US and European cases, industry groups lobbied for tariffs on the grounds that Chinese competitors received unfair government support. The justification for imposing anti-dumping and countervailing measures relies on the argument that such unfair competition damages domestic industries.

In my research, I investigate one aspect of such potential damage by studying the effect of Chinese competition on innovation in the European solar sector. Using a sample of around 10,000 firms in

15 EU countries over the period 1999 to 2020, I show that competition from China had a variety of effects.

There was an increase in patenting for firms with a low historical stock of solar PV patents, but a reduction among those whose historical patent stock fell within the top 10th percentile of sampled firms. Firms at the very top of the distribution, with a patent stock within the top 1st percentile, also increased patenting in response to competition.

My results suggest that these effects average out to zero. Moreover, firms with a large patent stock generally innovate less, which may be a sign of technological lock-in. Since firms with a lower historical patent stock tended to innovate more in general, it seems that competition provided further incentives for the most innovative firms.

On the flipside, I also find evidence in line with the broad consensus that Chinese import competition drove many European firms out of the market.

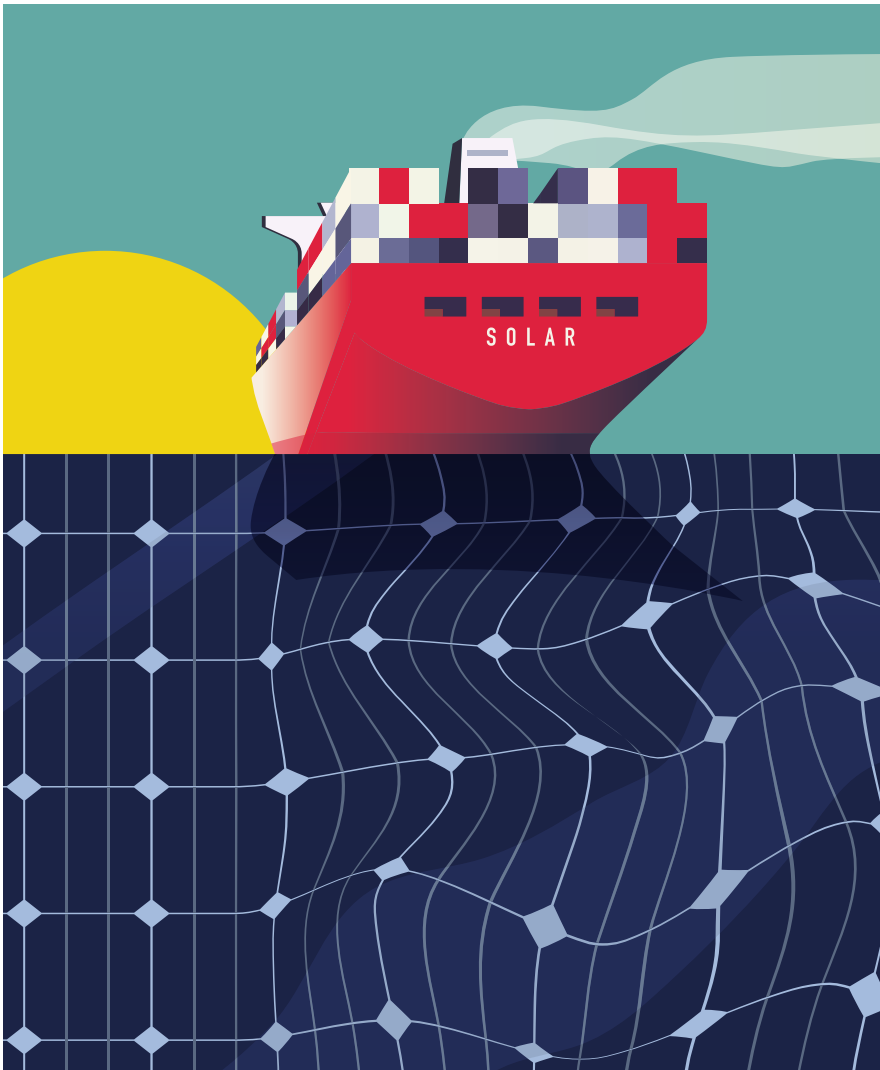
My analysis suggests that a \$100mn increase in exposure-weighted imports from China increased the odds of a firm going out of business in the following three years by about 10%.

Overall, it seems that many European solar firms did not survive the China shock – but some of those who did adapted by innovating more intensely.

Supporting clean technology

In the years after the period that I looked at, China has further cemented its dominant position in the global market for solar PV and other low-carbon supply chains. In 2022, between 76% and 96% of installed manufacturing capacity across all solar PV components was located in China, as well as 64% of global manufacturing capacity in nacelles and 69% of capacity for blades (both key components for wind turbines), and 80% of production capacity for batteries (IEA, 2023).

Both the United States and the EU have continued to respond using protectionist



measures, including protective tariffs and local content requirements. The latter are rules on what percentage of a product has to be made from domestically-manufactured components to be eligible for public tenders, subsidies or other government support. In May 2024, the Biden administration increased tariffs on Chinese electric vehicle imports from 25% to 100%, and those on lithium-ion batteries and battery parts from 7.5% to 25%. Tariffs on solar cells were raised from 25% to 50%.

In July 2024, the European Commission announced provisional duties of 17.4%-37.6% on Chinese electric vehicle imports, and in October 2024, the European Commission imposed tariffs of up to 35.3% on Chinese electric vehicles on top of the EU's standard 10% car import duty.

Protectionism increases the cost of using low-carbon technologies, and therefore has the potential to slow down efforts to mitigate climate change. On the other hand, concerns over supply

chain resilience – particularly in the face of geopolitical tensions – in key energy technologies should be given serious consideration.

Likewise, to be politically feasible, government support for clean technology may need to show benefits for domestic firms and workers. However, whether protectionist measures are the most appropriate way to promote domestic manufacturing in clean technologies – or, indeed, whether they are effective at all – is unclear.

While the US Inflation Reduction Act includes generous subsidies for clean technologies, the EU's Net Zero Industry Act relies primarily on regulatory reform. Perhaps it is time to consider a more direct approach to promoting low-carbon manufacturing: by supporting research and development and providing cheap finance and other upstream subsidies, instead of relying on costly protectionist measures.

This article summarises 'Adapting to Competition: Solar PV Innovation in Europe and the Impact of the "China Shock"' by Pia Andres, published in *Environmental and Resource Economics* in 2024. An earlier version appeared on *LSE European Politics and Policy* (<https://blogs.lse.ac.uk/euoppblog/2024/10/14/how-chinas-rise-has-shaped-innovation-and-exit-among-europes-solar-firms/>).

Pia Andres is a research economist at CEP working on the PRINZ (productive and inclusive net zero) project.

Further reading

Dolf Gielen, Francisco Boshell, Deger Saygin, Morgan Bazilian, Nicholas Wagner and Ricardo Gorini (2019) 'The Role of Renewable Energy in the Global Energy Transformation', *Energy Strategy Reviews* 24: 38-50.

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Gregory Nemet (2006) 'Beyond the Learning Curve: Factors Influencing Cost Reductions in Photovoltaics', *Energy Policy* 34(17): 3218-32.

Protectionism
raises the cost of
using low-carbon
technologies,
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hampering efforts
to tackle climate
change

in brief...

Do try this at work: the AI chatbot that can interview at scale

Large language models can conduct interviews at speed and at scale. **Friedrich Geiecke** and **Xavier Jaravel** present a new open source platform to support this innovative form of qualitative research.

Social science relies on two distinct approaches: quantitative research, which analyses large sets of numerical data; and qualitative research, which explores individual experiences and perspectives in depth.

Face-to-face or telephone interviews, which are the traditional method of qualitative research, require significant human and financial resources, and they are limited in terms of the number of participants that can be reached. But large language models (LLMs) offer an opportunity to conduct interviews at scale, creating a bridge between the richness of qualitative data and the statistical power of quantitative data. Specifically, the LLM can act as an interviewer, interacting with human respondents recruited on a standard online platform, such as Prolific, to conduct interviews with thousands of respondents in a matter of hours.

We have developed and launched an easy-to-use platform for conducting large-scale qualitative interviews, based on artificial intelligence (AI) in just this way. A chat interface allows the respondent to interact with an LLM, which collects their responses and generates new questions. The platform is adaptable to researchers' needs and capable of handling a wide range of topics while maintaining a general structure that ensures the reliability of the interviews.

The prompts used by the LLM incorporate best practices from sociological research, such as the importance of conducting interviews in a non-directive manner, encouraging participants to freely express their views and posing follow-up questions to ensure clarity. For example,

it gathers "palpable evidence" to understand topics that respondents may sometimes express in abstract terms. The conversational agent also demonstrates "cognitive empathy", using follow-up questions to try to understand the respondent's perspective if this is useful to deepen its understanding of the main theme of the interview.

We analysed its performance against traditional qualitative interview practices, both from the perspective of interviewees and qualitative research experts. First, we asked a team of sociology PhD students from Harvard and the LSE, who specialise in qualitative methods, to assess the quality of interviews based on the interview scripts. The AI-led interviews were rated approximately comparable to an average human expert (under the same conditions).

Additionally, during the interviews, respondents were asked to evaluate the quality of the interaction. A vast majority of participants reported enjoying their interaction with the conversational agent and preferred this mode of interview over filling in text boxes. They felt that it captured their thoughts well, they tended to write significantly more words with the LLM than when filling out an open text field and found this interview method to be non-judgmental.

We also explored the capacity of AI to analyse different kinds of qualitative questions by using it to study three different subject areas: subjective issues such as "what gives meaning to life"; sensitive issues like political opinions; and complex areas such as decision-making for occupational and educational choices.

First, we aimed to identify key activities that serve as major sources of meaning in life (defined here as a subjective sense that one's life makes sense, has purpose and matters to others) and the states that individuals associate with meaning in life, with particular interest in differences across socio-demographic groups.

AI-led interviews revealed more information than conventional open text fields, with a 142% increase in the number of words that respondents wrote. They helped to uncover significant activities and subjective states that were not easily anticipated, such as the importance of pet

AI-powered interviewers
can create a bridge
between the richness
of qualitative data and
the statistical power of
quantitative data

When being interviewed about their political opinions, people prefer a non-judgmental artificial interviewer to a human being

care and companionship, which seemed to emerge as a source of meaning in life approximately as frequently as spirituality and religion.

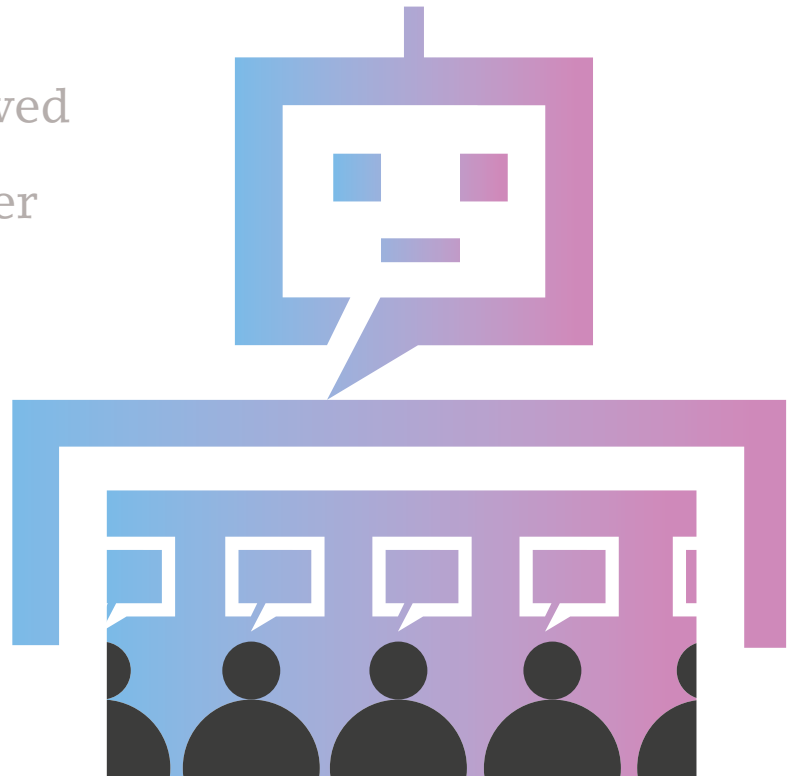
The large sample of respondents enabled variations between different socio-economic and political groups to be documented. For example, Republican voters were more likely to mention religion as a source of meaning compared with Democrat voters.

The second application examined political opinions and the reasons behind electoral choices. Here, participants preferred interacting with a conversational agent perceived as a non-judgmental entity, rather than a human interviewer, allowing them to feel more comfortable and to express their views freely, especially on sensitive political issues. Focusing on the French legislative elections, with interviews conducted a week before the elections, they show the adaptability of the conversational agent to languages other than English.

The study also revealed insights about political polarisation. Depending on their political affiliation, voters had different views on political priorities. They are attracted to specific policies as solutions to issues that they consider important, rather than being guided by the general ideology of their preferred party.

In the third application, we explored key factors in decision-making using the example of educational and occupational choices, particularly in STEM (science, technology, engineering and mathematics) fields and innovation careers, with a focus on understanding why certain groups are underrepresented. Consistent with previous research on this topic, financial and sociological factors (such as family, mentors and childhood interests) were crucial, with a major role played by individual passions.

Finally, ethical concerns must be mentioned. To participate in the interviews, respondents must agree to their data being seen by the firms that own the language models, which may raise privacy concerns for some participants.



As smaller, local language models become increasingly capable, it is likely that high-quality interviews can be conducted with them, mitigating potential privacy issues.

This approach due to its flexibility and open-source platform, can offer researchers a new tool to conduct large-scale, rigorous interviews on a variety of topics, while allowing researchers to maintain full control over the prompt and interface. The general instructions provided to the LLM are perceived differently in terms of quality, depending on individual researchers' preferences.

The platform's flexibility allows researchers from different schools of thought to tailor the interviews to their preferences, for example, by focusing on narratives rather than concrete examples. We propose several avenues for improvement and consider the implications of making the conversation, currently conducted via text chat, more fluid by adding a voice option.

This article first appeared on *LSE Impact* as 'AI can carry out qualitative research at unprecedented scale' (<https://blogs.lse.ac.uk/impactofsocialsciences/2024/10/30/ai-can-carry-out-qualitative-research-at-unprecedented-scale/>).

Readers can find the code and a simplified version of the application that doesn't require Python at <https://github.com/friedrichgiecke/interviews>

Friedrich Giecke is an assistant professor of computational social science at the Department of Methodology at LSE.

Xavier Jaravel is a professor of economics at the Department of Economics at LSE and an associate in CEP's growth programme.



Online consultations with doctors are convenient for patients and produce similar health outcomes to in-person visits. But research by **Amanda Dahlstrand, Nestor Le Nestour** and **Guy Michaels** finds that deciding which patients are seen online is crucial to whether significant cost savings are made.

The doctor will see you now: comparing online and in-person consultations

In today's hybrid world, many organisations need to decide whether one-to-one services, such as financial advice, tutoring or healthcare, are delivered online or in person. Although the shift to online provision can potentially lower costs and increase convenience, the nature of such meetings may change significantly when conducted through a screen. In theory, switching services to an online format could affect costs, quality, users' experience and subsequent outcomes.

Although online service delivery has become more common in recent years, there is limited evidence from direct comparisons of in-person and online one-to-one services. To be more informative for decision-makers, we need a deeper understanding of the trade-offs involved.

Choosing the appropriate delivery mode is particularly important in healthcare. For providers, including both private and public healthcare organisations and insurers, the shift to online services presents opportunities for productivity gains, which are urgently needed given the rising costs of ageing societies.

For patients, online healthcare services provide convenience, around-the-clock access, time savings, reduced risk of contagion and the potential to level the playing field between urban and rural areas as well as between richer and poorer neighbourhoods (Dahlstrand, 2022). Key to healthcare delivery are patient consultations with doctors working as primary care physicians, also known as general practitioners (GPs).

Our research examines the impact of

Online consultations can be more convenient for patients, but some patients may need to be seen in person later

switching primary care consultations with doctors from in-person to online meetings on various patient outcomes and provider costs. To do so, we assemble new data on individual consultations from Sweden, where national health insurance covers both public and private providers, and both online and in-person consultations.

The primary contributor of our data is one of Europe's largest digital healthcare firms. Since 2019, this firm has provided patients who have chosen it as their primary care provider with comprehensive primary care, including both in-person and online consultations. The data encompass both consultation types and are matched with anonymised individual panel data on patient demographics, socio-economic characteristics and numerous health outcomes from the rest of the healthcare system.

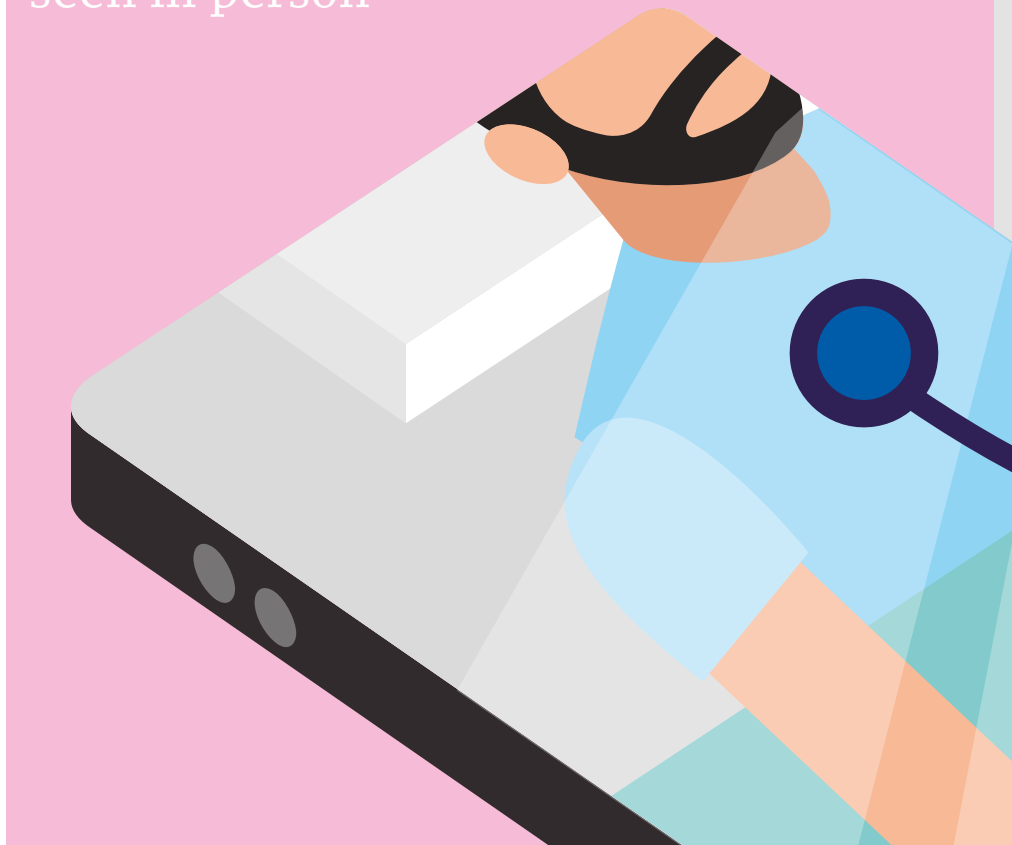
How to identify the true costs and benefits of online consultations

One challenge in comparing online and in person consultations is that similar data about patients in both modes is rare. We have such data given that the same primary care provider offers both types of consultations. Patients always start their care journey online, in the app. We only consider patients who were directed to online nurses as a first step. The nurses then determine whether the patients should consult (as soon as possible) with a doctor, and whether this consultation should be in person or online. This setup allows us to compare the differing effects of the two modes for similar patients.

A second challenge arises because nurses may sort patients into online (as opposed to in person) consultations with doctors based on factors that we cannot observe. To address this issue, we use variation in nurses' tendency to direct patients online, as measured in other patient meetings. This allows us to approximate the effects of randomly allocating patients to the two consultation modes.

Our method shows that causal cost savings from online consultations are lower than simpler comparisons suggest. This difference is because our method addresses a sorting problem – that, on average, those patients are sent to in person consultations are sicker than those seen online (this is a problem for identifying true effects, but

Organisations offering online consultations should carefully consider which patients are best seen in person



in practice this sorting is good). In the following, the results will be from our method to address this sorting, which means that we compare similar patients to get at causal effects.

We find that online consultations occur sooner and are shorter overall than in person ones. Despite this difference, they yield similar within-consultation outcomes as in person ones, including rates of informative diagnosis, prescriptions, specialist referrals and patient satisfaction.

We next examine the effect of online consultations on hospitalisations, visits to accident and emergency (A&E), and new visits to the primary care provider within 30 days after the meeting with a nurse or the consultation with a doctor.

We find significant increases in doctor-booked in-person follow-up consultations in primary care and in visits to A&E. But for medium-term outcomes (more than 30 days after the consultation with a doctor), we find no significant effects on any of these.

Taken together, our estimates suggest

that online consultations offer some cost savings to payers (eg national health insurance) without significant medium-term adverse health effects on patients, but these cost savings are reduced by the increase in short-term follow-ups.

While these findings indicate that online consultations are not a cost panacea, they still provide patients with valuable advantages, such as the ability to consult doctors sooner, reduced contagion risk and greater scheduling flexibility, including availability outside regular work hours.

Different patients, different attitudes

Our estimates show relatively high follow-up rates for two reasons. First, we study patients directed to any doctor consultation, in person or online, by nurses (versus being advised by the nurse about self-care), and those patients are likely sicker and more prone to follow-ups than patients not directed to any consultation.

Second, our sample consists mostly of patients from big cities (where in-person



clinics with the hybrid option were first opened), for whom travel to in-person follow-ups and A&E is less time-consuming than patients in remote areas. Thus, directing the average Swedish patient to an online consultation (as opposed to an in-person one) is likely to yield larger savings to the healthcare system than those in our sample, as fewer rural patients would likely travel to the A&E.

We also find that patients generally view online consultations as replacements for in-person ones. But older patients and immigrants are slightly more sceptical of online consultations. Given this finding and our results on sorting into online consultations, we explore the possibility that online consultations may be better suited for less vulnerable patients.

Consistent with this hypothesis, we find suggestive evidence that patients with histories of hospitalisations or visits to A&E are considerably more likely to follow up after online consultations than other patients. We also find that directing vulnerable patients to in-person consultations and less vulnerable ones to online consultations may save costs for both providers and patients. In part, this is similar to the sorting that already happens in the organisation studied.

The wider impacts of hybrid health organisations

By examining a setting where assignment to online versus in-person care occurs after patients have already requested care, we shed light on the respective causal effects of online and in-person delivery, free from concerns about the sorting of different patients (or the same patients under different symptoms) into care based on their expectations of online or in-person consultations, and from providers' sorting of patients into consultation modes.

Taken together, our findings suggest that in-person follow-ups after online provision and differences in patients' needs are important considerations for hybrid health organisations. These and other considerations may affect the organisation of other hybrid one-to-one services in a large number of providers worldwide.

This article summarises 'Online versus In-person Services: Effects on Patients and Providers' by Amanda Dahlstrand, Nestor Le Nestour and Guy Michaels, CEP Discussion Paper No. 2021 (<https://cep.lse.ac.uk/pubs/download/dp2021.pdf>). An earlier version appeared as 'Online versus in-person services: Effects on patients and providers' on *LSE Business Review* (<https://blogs.lse.ac.uk/businessreview/2024/08/16/how-do-online-doctor-consultations-compare-to-in-person-ones/>).

Amanda Dahlstrand is an assistant professor at University of Zurich and an associate in CEP's labour markets programme. **Nestor Le Nestour** is a student at the University of Stockholm. **Guy Michaels** is an associate professor of economics at LSE and director of CEP's labour markets programme.

Further reading

Amanda Dahlstrand (2022) 'Defying Distance? The Provision of Services in the Digital Age', CEP Discussion Paper No 1889 (<https://cep.lse.ac.uk/pubs/download/dp1889.pdf>).

Online consultations lead to similar levels of prescriptions, referrals and patient satisfaction

Daniel Kahneman: a legacy

The late Nobel laureate Daniel Kahneman had a long association with CEP. At an LSE event, **Richard Layard**, **Gillian Tett** and **Paul Dolan** discussed how his work influenced psychology, economics and society – and their experience of researching and debating with him.

The bestselling book *Thinking, Fast and Slow* brought psychologist Daniel Kahneman into the public eye in 2011 at the age of 77. But he was already well-known among economists – having won the Nobel Prize in 2002. The award was given for his work on prospect theory, conducted with Amos Tversky, which revolutionised the way in which economists think about how people behave – questioning the assumption that people make rational decisions, motivated primarily by self interest.

“They exploded the idea that people are rational and consistent in the choices they make”, explained Richard Layard at an LSE public lecture held in honour of Kahneman’s massive impact on the field. “Danny and Amos showed how people use rough and ready heuristics, they depend hugely on how a choice is framed and they judge many outcomes relative to the status quo. They were the founders of behavioural economics.”

The implications for public policy were profound – if you are estimating the social value of something by what people are willing to pay for it, but if people don’t make decisions in the way you had assumed [being driven by self-interest], then how can you calculate its value?

Kahneman’s solution was to measure the effect of a policy on how it affects people’s wellbeing and judge the policy by that outcome.

Measuring wellbeing

Layard then revealed that Kahneman’s Robbins lectures given at the LSE in 1998, changed his life. “I changed everything that I worked on, because Danny had persuaded me we could measure wellbeing.”

When Layard set up the wellbeing programme at

CEP, he collaborated closely with Kahneman. Their work with Paul Dolan led, in 2011, to the British government reporting the nation’s wellbeing in its official statistics. Kahneman was also instrumental in setting up the measurements reported each year in the *World Happiness Report*. And the Treasury green book, which is used to evaluate government policies, has now been reviewed to encourage the use of wellbeing measures – all things that Layard attributed to the prestige Kahneman gave to this line of work.

“But Danny was not just a great thinker and scholar, he was also a wonderful person,” Layard said. “He was just marvellous to be with. He was so clever but he was also so charming and so sweet-natured.”

The importance of behavioural economics

Gillian Tett, provost of King’s College, Cambridge, and Financial Times columnist, outlined three fundamental aspects of Kahneman’s legacy. First, forcing the journalistic, economic and policymaking world to rethink their obsession with models.

“When the financial crisis of 2008 happened, it suddenly became clear that rational man was not so rational at all”, she said. Adding that insofar as economics got a reprieve after 2008, it was Danny Kahneman’s important and relevant work on behavioural economics that was responsible. He helped make it clear that while models can be useful, they are limited because people are not rational – and that really matters.

The second legacy is the question of how we relate to machines: robots and artificial intelligence, as discussed in his last book *Noise: A Flaw in Human Judgment*,

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co-authored with Olivier Sibony and Cass Sunstein. This book points out that while there are concerns about data-driven decision-making, human decision-making is also flawed by psychological biases and perhaps a combination of approaches could be useful.

Third, she praised Kahneman's curiosity and humility. "He was constantly saying 'tell me how I'm wrong, tell me how I can rethink my ideas'," she remembered, something that may seem to be part of academic life, but is difficult in practice.

Humility and wisdom

Paul Dolan, professor of behavioural science at LSE, picked up on this theme in remembering how he and Kahneman had spent "20 years disagreeing" albeit with a view to resolution – and explained how such debates informed his own work on happiness.

Kahneman became particularly interested in adversarial collaboration, said Dolan: a form of research that brings together people who explicitly disagree to work on a problem. In theory, as they have agreed the research methods and then work together, the researchers can then agree on the conclusion – meaning that they might change their minds.

Dolan pointed out that Kahneman was pessimistic about whether, even using this method, people would actually change their minds – instead tending to find ways to justify why they didn't need to do so.

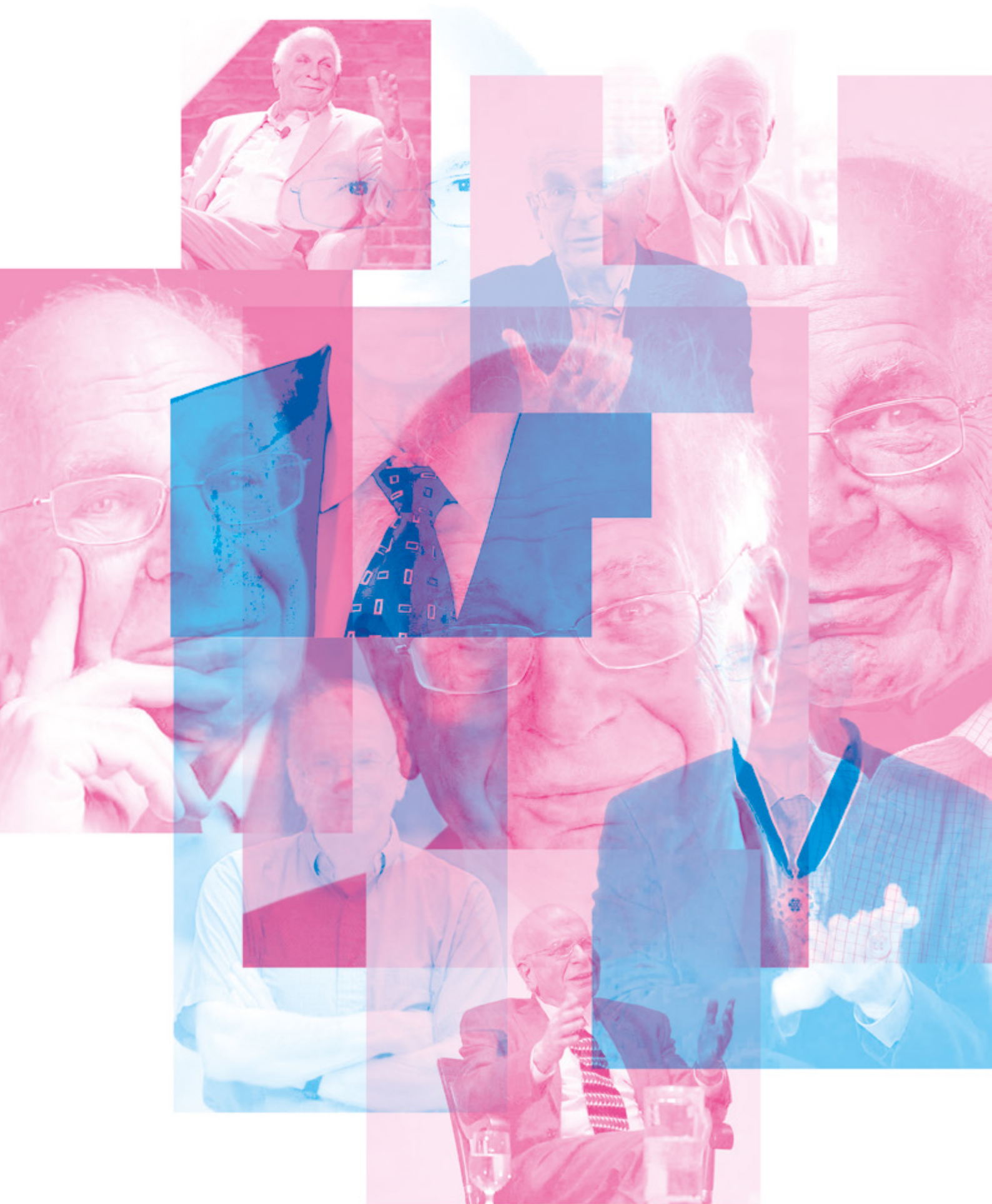
But, explained Dolan: "Danny and I fundamentally agreed that it's a lot better than the alternative, which looks like 'angry science' as he called it. People writing comments and rejoinders to score academic points."

He concluded that adversarial collaboration underlines the point that we're all learning as we go. And this was Kahneman's nature, Dolan said, he was a man of both humility and great wisdom.

● Read Barbara Tversky's piece remembering the life and work of Daniel Kahneman on **page 18**.

By **Helen Ward**, head of public affairs and communications at CEP. A recording of the LSE public lecture *Daniel Kahneman: a legacy* is available on the LSE website (<https://www.lse.ac.uk/Events/2024/11/202411181830/Daniel-Kahneman-a-legacy>).

Paul Dolan remembered how he and Kahneman had spent '20 years disagreeing' albeit with a view to resolution



Following an LSE event discussing the legacy of Daniel Kahneman (5 March 1934 to 27 March 2024), **Barbara Tversky** remembers him and his work.

Remembering Daniel Kahneman

There were many Dannys. Each of us who knew him, knew different ones. I, myself, knew many.

The first Danny I met was at the University of Michigan in 1965. He was a post-doc, I was a graduate student, soon to marry another Israeli, Amos Tversky. They knew of each other but hadn't met. Israelis abroad gravitate to one another. That Danny was wiry and wired. Fast, eager to say, eager to do, eager to please, excited and excitable. Changeable, minute by minute. Pro, con, in the middle. One idea, then another. And another. Beginning a new sentence before he'd finished the previous. Upbeat, then sour. It was hard to get a fix on him, hard for him too, he hadn't settled on who he was.

One Danny was certain. He was a psychologist, by inclination and by upbringing. His mother was a gossip, dissecting why people were the way they were, why they did what they did and what they didn't do. It was never simple and rarely about money. It was about character encountering a situation. Psychologists look at motives differently from economists.

Danny entered psychology as an undergrad at Hebrew University at just the right time. The field was breaking the shackles of behaviourism. You could open the black box and peer into the mind. You saw the mind as an information processor. You could analyse your own intuitions, and you could test them in clever experiments.

All the Dannys thrived on new ideas.

All the Dannys read voraciously. For one thing, reading was a sure way to get new ideas. When he moved to Israel from Paris after the war, he first lived with American relatives who had a large library in English that he went through one book after another, learning English and Hebrew at the same time. Early in his career, that explosion of ideas took him every which way – perception, personality, language, attention and clinical.

At Michigan, he read a *Scientific American* article with two seemingly identical photographs of an attractive woman. Yet people agreed that one of the photos was more attractive, the one where her pupils were larger. Larger pupils indicate interest. People were attracted

Psychologists look at
motives differently from
economists

to the woman who appeared to be more interested in them. Oddly, the attractive part wasn't what caught Danny's eye. Instead, he and Jack Beatty showed that the pupil grew bit by bit as memory load increased. The pupil revealed attention, and it revealed effort. Danny turned those ideas into his first book, *Attention and Effort*. His infectious excitement drew others. Because his lab was across from my office, I was an easy target as a pilot subject, which was a guaranteed headache, but how could I resist. Danny knew that asking others for help bound them to him and he to them. When someone asked for help, he saw it as an obligation. He signed boxfuls of books for people he didn't know and sent them back. If someone invited him out for his birthday, he was delighted, and would take the bill. Generosity was another enduring, endearing trait.

Like many of his projects, the work on the pupil had legs, to use an expression of Danny's. Chatbots know about it. I found myself working on it years later with a grad student in computer science who I was co-supervising at Stanford. In 2022, a group of researchers organised a meeting on attention and effort and invited Danny to speak. Characteristically, he dived into the recent literature, emerging with a burst of new ideas. Also, characteristically, he couldn't find his copy of his book. Fortunately, I had mine.

Almost all of Danny's projects had legs. Amos used to say that the half-life of a new idea was five years. Not so for Danny's. The work on the pupil is still alive. Heuristics, biases, prospect theory are alive. Wellbeing, adversarial collaboration, alive. Of course there are critics, but the fields are lively. *Thinking, Fast and Slow* still makes the bestseller list, and the core idea of two systems (which, as he said, he borrowed from others) is key to research in artificial intelligence (AI). Fast thinking, System 1, lets you quickly recognise acquaintances and situations. It can also make mistakes, as in: If a bat and a ball together cost \$1.10 and the bat costs \$1.00 more than the



ball, how much does the ball cost? Most people incorrectly answer \$0.10. Slow thinking, System 2, allows you to compute your taxes and sometimes corrects errors of System 1, correctly answering \$0.05 (Frederick, 2005).

Biases and heuristics are one source of errors of judgment. Danny's last book, *Noise: A Flaw in Human Judgment*, written with Olivier Sibony and Cass Sunstein, elucidates another source, no less powerful: noise, the unreliability of judgments within and across people.

The autumn of 1966 took Danny to Harvard for another post-doc and Amos and me to the Hebrew University in Jerusalem. Danny returned to Jerusalem a year later and soon after invited Amos to speak on decision-making in his seminar. This led to a short-term disagreement and a long-term collaboration and friendship that they carried across continents. They saw parallels between Danny's work on perception and Amos' on cognition, hence cognitive illusions. They savoured long hours together, paroxysms of laughter mixing with ideas. When my older son was a little over a year, he asked: "Where's Daddy?" I said: "At work." He said: "Daddy talking Danny." Wives and children were frequent pilot subjects for version

after version of their questionnaires. Our children grew up with odd ideas of what "work" was.

Working on biases did not make them immune; on the contrary, because they were not immune, they could examine their own closely. They had revolutions several times a week. Like a bunch of kids, they would rush out of whatever room they had been working in, giggling, eager to tell me the latest theory. I was privileged to have a front row seat to those revolutions, but I think they drove Danny's later collaborators crazy: they had barely absorbed one theory only to be hit by a new one. It mystified me that despite the upheavals, they all seem to have loved him. Danny gave everyone the feeling they were special. They were, to him.

Their best-known biases are representativeness (similarity) and availability (retrievability) used as heuristics for judging unknown and often unknowable probabilities. The classic example of representativeness is Linda. Respondents were told that she was a philosophy major, active in leftist causes as a student. They were asked if, at 31, she was more likely to be a bank teller or a bank teller active in the feminist movement. Because being a bank teller active in

Danny gave everyone the
feeling they were special
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the feminist movement seems more representative of someone who had been involved in leftist causes as a student, than simply being a bank teller, a majority judged the conjunction of bank teller and active in the feminist movement as more probable. This violates the elementary rule of probability that a conjunction of properties cannot be more probable than any of the single properties. An example of availability bias is evident in the judgment that homicides are more frequent than suicides (Lichtenstein et al, 1978). The media report homicides but rarely report suicides, so examples of homicides are easier to retrieve.

By now, Danny had a focus. As he said, Amos focused him. After probability, they turned to choice, weighing probability and utility, value. Their most cited paper, the one that after Amos' death won Danny the Nobel Prize, was prospect theory. You start from a reference point. Losses loom larger than gains. Choices can be reversed by whether they are framed as losses or gains.

Not long after prospect theory, Danny struck off on his own, chasing the value side of the equation. He worked on fairness with his good friend Richard Thaler. Danny regarded Thaler as the catalyst for the thriving field of behavioural economics and was thrilled when Thaler won the Nobel Prize in 2017.

Danny turned to happiness and wellbeing, collaborating with Richard Layard, Angus Deaton, Paul Dolan, Donald Redelmeier and others. But how to measure wellbeing when the remembering self disagreed with the experiencing self? At a meeting on wellbeing at Oxford in 2022, Danny answered a question he hadn't been asked: "The most important contribution I made to the study of wellbeing was to get Richard Layard interested in it."

Danny knew his own happiness depended on that of those around him. One of his more endearing biases was to glorify the people around him and to be biased towards everything they did

and thought. He took joy from the joy of others, he wanted to hear all the wonderful things that happened to them. That had a snowballing effect, you only told Danny the good things, not what was making you miserable. If you could make him happy, you were happier.

That intuitive wisdom was not just reflective in Danny, it was reflexive. In 1991, Danny's family lost their home, with years of letters and photographs, to a devastating fire in the Berkeley hills. The insurance payment was generous. It was clear to him that buying an even better house was essential. They had had a two-bridge view, now they had a three-bridge view. The key to loss is to increase the gain. Upgrade.

Years ago, one of the legendary tech bros asked Danny how he, the tech bro, could get someone to engineer his life to make him happy. Danny had noticed tension between the tech bro and his wife earlier in the evening. I am not certain that Danny actually said this, but I know he thought, you can't be happier than your wife. Make her happy.

The last Danny I knew was as his partner for the last four and a half years of his life, after we had lost our spouses. That Danny was wise, confident, mellow and joyful. He left a vast legacy. He had contributed to attention, judgment, choice, rationality, fairness, wellbeing, the conduct of research and AI among them. His work has had continuing influences on policy. His modesty, his humility, was not a veneer, it ran deep within him. He knew he could be wrong. He often said he liked changing his mind, he learned new things. I learned long ago you couldn't change his mind, he had to change it. You could surreptitiously suggest other views but confronting him led to a brilliant bruising counterattack. He knew there were people smarter and wiser than him, he knew he had been extremely fortunate, first and foremost in his friends and collaborators, often the same. He never stopped having ideas. As he said, he died a happy man.

Barbara Tversky is an emerita professor of psychology at Stanford University. She was married to Amos Tversky from 1966 until his death in 1996. After the death of Daniel Kahneman's wife, Anne Treisman, she and Danny lived together as partners from 2020 until his death in 2024.

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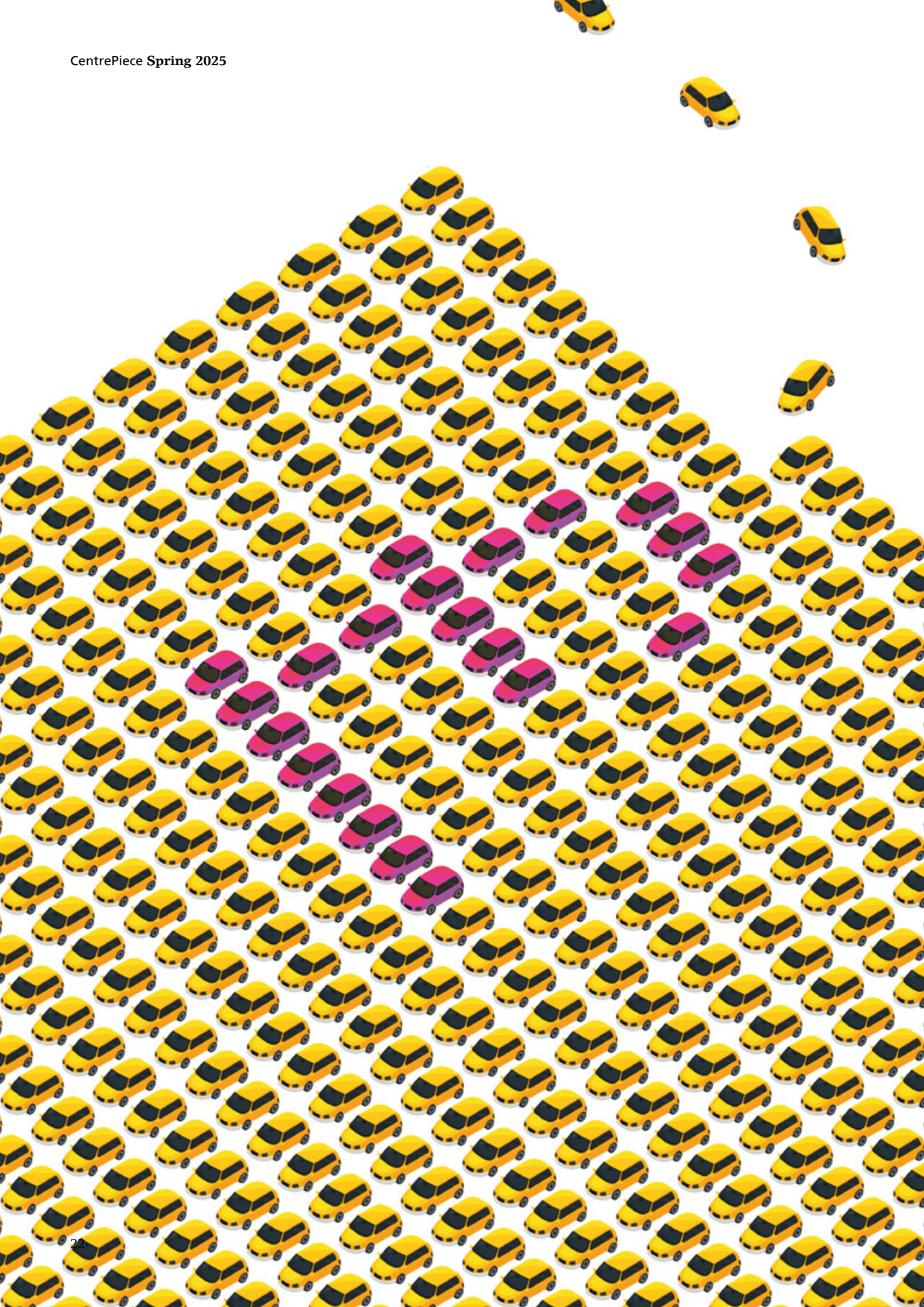
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His modesty, his humility,
was not a veneer, it ran
deep within him



Fast productivity growth in the UK car industry led to staff in the sector earning about 37% more than the average manufacturing employee by the 2010s. But **Andreas Teichgraeber** and **Tim Obermeier** show that while wages went up, the share of the productivity gains going to workers declined.

Revving up wages: How rising productivity has benefited car industry workers

Real wages of UK workers have stagnated since the global financial crisis of 2007-09. At the same time, labour productivity, the value of goods produced per worker, has seen minimal growth.

Many politicians, policymakers and economists attribute the stagnation in wages to sluggish productivity growth. By examining the relationship between productivity and wage growth in the UK car industry, we find that increases in productivity can indeed benefit workers. This evidence from one industry offers valuable insights for efforts to address the UK's broader productivity and wage growth challenges.

Our study covers the period from 1980 to 2018. With 1.5 million passenger cars produced in 2018, the UK was the fourth largest car-producing country in Europe (just behind France with 1.8 million cars). Several multinational companies such as Jaguar Land Rover, Nissan and Toyota produce in the country.

Over time, employment in the industry has declined, but there has been a strong increase in productivity. Our findings suggest that while this has helped to boost wages, the extent to which workers have benefited has changed. Among important insights for policymakers, we find that productivity growth can play an important role in raising wages. This is even more relevant in view of the stagnation of wage growth in the UK over the last 20 years.

A productivity surge in the car industry

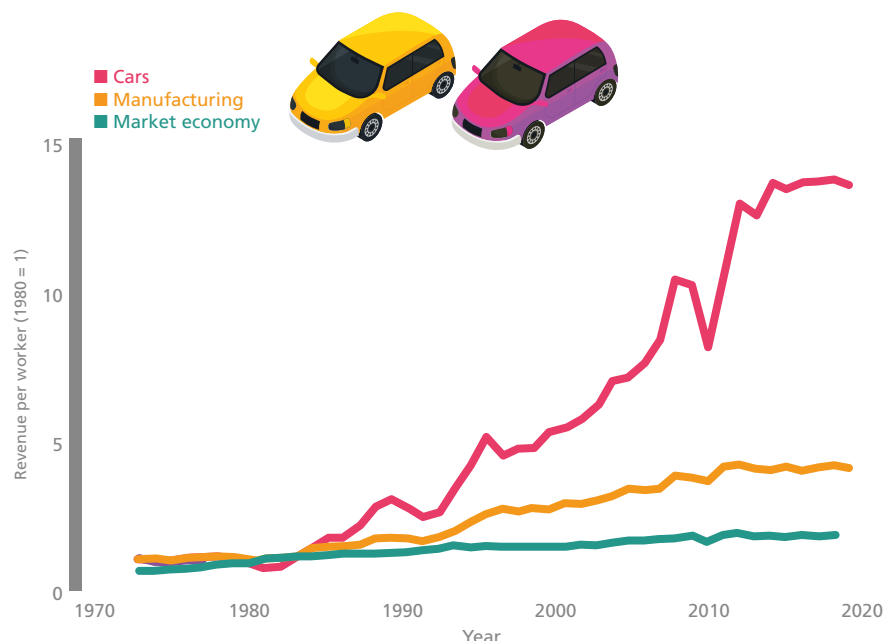
Over the past 40 years, there has been a remarkable growth in productivity in the UK car industry, with output per worker increasing twelvefold since 1980, far exceeding the fourfold increase seen across the broader manufacturing sector (see Figure 1). By 2018, the car industry's importance to the UK economy had grown, accounting for over 11% of the UK manufacturing output, up from just 5% in 1980.

There are a few key drivers behind this. The industry became more deeply integrated into global supply chains, increasing outsourcing and reliance on parts from other countries. At the same time, carmakers invested heavily in automation, boosting the amount of machinery and technology used per worker.

We find that this shift led to a significant improvement in total factor productivity, which is a measure of how efficiently resources like labour and capital are used. In fact, total factor productivity in

Most of the wage growth for UK car workers can be linked to improved productivity

Figure 1:
Productivity growth in the UK car industry



Notes: The chart shows productivity in terms of gross output per worker for the car industry, manufacturing and the market economy. Gross output is measured as turnover. Values are normalised to 1 in 1980.

the car industry grew at twice the rate of the rest of UK manufacturing.

Car workers fared better than others

The big question is whether these productivity gains have led to higher wages for car workers. Based on our findings, it seems that these workers have earned more compared with their counterparts in other manufacturing sectors. The “wage premium” – the difference between what car workers earn and what workers in other manufacturing sectors make – has grown significantly since the 1980s.

Back in the 1980s, car workers were earning about 18% more than the average manufacturing worker. We find that by the 2010s, that premium had nearly doubled to 37%. Even when we adjust for differences in education, experience and job roles, the premium increased from around 8% in the 1980s to 17% in the 2010s.

Both productivity and wages have increased substantially more in the car industry than in other sectors in the UK economy since 1980, but this does not mean, in itself, that there is a causal link between the two.

To understand how productivity growth

has affected wages, we use what’s called a rent-sharing model. Rent-sharing occurs when firms share a portion of their profits or productivity gains with workers in the form of higher wages. Our results suggest that around 63% of the increase in wages for car workers can be linked to the industry’s productivity growth.

But rent-sharing has fallen over time. In the 1980s, a larger share of productivity gains went to workers, but by the 2010s, this share had dropped. In fact, if rent-sharing had stayed at 1980s levels, wages for car workers today might be around 38% higher.

Lessons for policymakers

The experience of the UK car industry suggests that productivity growth can be an effective tool for raising wages. Supporting innovation, encouraging investment in new technologies and helping industries integrate into global value chains can help sectors to become more productive.

As the car industry demonstrates, when companies become more efficient, there’s an opportunity for workers to benefit as well. The sector’s strong productivity growth has led to significant wage gains

Car manufacturers have shared less of their gains with workers over time

for its workers, particularly in comparison with other manufacturing sectors.

This shows that increasing productivity can play a critical role in improving pay and living standards across the economy. Indeed, increasing productivity is a key part of the UK chancellor’s “new era for economic growth”, which she announced shortly after taking office.

But while productivity growth is key, it is also important to ensure that workers receive a fair share of the gains. Our findings suggest that car manufacturers have shared less of their gains with workers over time. Evidence from other research suggests that this is true in other sectors as well. Implementing policies that bolster workers’ bargaining power could help to ensure that productivity improvements translate into wage increases for workers.

Notably, productivity growth among UK car manufacturers (and other industries) has been on a downward trend since the Brexit referendum. If this pattern persists, the repercussions are likely to extend beyond job losses and reduced profits, affecting workers’ wages too.

This article summarises ‘An Engine of (Pay) Growth? Productivity and Wages in the UK Auto Industry’ (2024) by Agnes Norris Keiller, Tim Obermeier, Andreas Teichgraeber and John Van Reenen, CEP Discussion Paper No. 2015 (<https://cep.lse.ac.uk/pubs/download/dp2015.pdf>). An earlier version first appeared on *LSE Business Review* (<https://blogs.lse.ac.uk/businessreview/2024/11/05/the-productivity-boom-in-the-british-car-industry-benefited-workers-with-a-caveat/>).

Andreas Teichgraeber is a PhD student at LSE and a research assistant in CEP’s growth programme as part of the Programme on Innovation and Diffusion.

Tim Obermeier is a lecturer in economics at the University of Leicester and an associate in CEP’s growth programme.

in brief...

Successful caps on fees disprove the idea that it's unwise to meddle with free markets

Jan David Bakker and **Nikhil Datta** show how the success of a reform of letting agents' fees was partly due to their hidden nature.

Five years ago, the UK government enacted the first legislation regulating prices in the English rental market since the 1960s. The Tenant Fees Act 2019 didn't interfere with what landlords can charge tenants in rent, but targeted lettings agents instead.

Lettings agents are ubiquitous on British high streets. They provide services such as finding tenants for landlords and managing properties – especially important in a country where most rentals belong to small-time investors who are not professional landlords.

But there had long been concerns that agents were charging beyond what was considered a reasonable price. They had been frequently charging tenants in excess of £1,000 to secure a deal – or even higher by charging a month's rent upfront. Under the 2019 act, the maximum they could charge tenants for a rental deal became £50.

Around the world, people who set housing policy have been watching closely. Tampering with a rental market can have adverse consequences, and no one has

attempted to target agents in this way before. Our research reveals for the first time how it has played out.

Rising rents have been one of the main reasons for the cost-of-living crisis, both in the UK and elsewhere, but intervening isn't as simple as you might think. Rental caps, for example, can lead to renters moving less often, because they lose their protection if they sign a lease elsewhere (Diamond et al, 2019; Mense et al, 2023). It can see more rental properties getting converted into owner-occupier homes and developers building fewer new rentals, which in turn can make it harder for prospective tenants to find a rental property.

The quality of rental properties can also fall because landlords have less money to spend on them, while the rents on any properties not covered by the cap tend to rise. This helps to explain why the Conservatives shied away from rental caps in the UK, and also why Labour is not introducing them in its current Renters' Rights Bill.

Capping agent fees has saved renters an average of £400 per tenancy



Rising rents have been one of the main reasons for the cost-of-living crisis, but intervening isn't simple

UK governments have instead sought to make it easier for tenants to become homeowners, such as with right to buy, help to buy and stamp duty exemptions for first-time buyers. Yet these have also produced mixed results.

Help to Buy, for example, which ran during most of the recent Conservative era, increased prices by more than the value of the subsidy and did not increase the amount of housing in supply-constrained areas (House of Lords, 2022). Time will tell whether Labour's plans to build 1.5 million more houses will be any more successful.

So how has targeting lettings agents worked out? Economics 101 suggests that in markets with a lot of competition, governments don't need to intervene as prices should be low and quality high. There are certainly lots of letting agents in the UK, so one might have thought that agency fees simply reflected the costs they incurred for their service.

Before the 2019 act came into force, this prompted some commentators to worry that agents would instead charge landlords more, who would then pass on the cost to their tenants with higher rents. For example, Capital Economics predicted that either rents would increase by an average £103 per year, or up to 16,000 agency jobs would be at risk in the sector to cover the cost.

In fact, our five years of research show that the policy did not lead to higher rents. Some letting agents increased the fees they charged to landlords, passing on some 25% of their reduction in revenues. This led to some landlords switching letting agent, but far less than you would expect in a competitive market.

We also found no evidence of landlords leaving the market, or of agencies closing down. The main effect of capping agent fees has been to save renters an average of £400 per tenancy. In other words, the reform has been a success.

So why were there no adverse consequences? The key lies in three features of the rental market. Tenants don't seem to pay attention to fees when selecting a property, possibly because they're often hidden in the depths of agents' websites and not easy to understand. In many cases, tenants only learn about how much they have to pay after having chosen a property and when signing the contract.

On the other hand, tenants are heavily influenced by rental prices, making it harder for landlords to pass increased fees on to them. And competition among letting agents is such that it only allowed them to pass on a fraction of their losses.

This all has important implications for other jurisdictions. Notably, New York City Council has passed similar legislation, in a city where brokers' fees can be as high as 20% of the annual rent.

These types of "dripped" fees that consumers only discover after making their purchase are also common across many industries, including air travel, concert tickets and Airbnb rentals. The UK recently passed a Digital Markets, Competition and Consumers Act, which will require vendors and agents to make all fees clear upfront, while the Biden-Harris administration has introduced something similar in the United States, where these have been dubbed "junk fees" by Joe Biden.

Our findings in the UK tenants' market suggest that these generate bumper profits for companies. Banning them elsewhere or in other sectors is likely to have a comparably beneficial effect. The lesson for those in government is that a market's structure, and situations where information is initially hidden from customers, can sometimes give policymakers more headroom to intervene than basic free-market assumptions might suggest.

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This article was originally published on *The Conversation* (<https://theconversation.com/successful-caps-on-english-letting-agents-fees-disprove-the-idea-that-its-unwise-to-meddle-with-free-markets-240708>). This article summarises 'Avenging the tenants: Regulating the middle man's rents by Jan David Bakker and Nikhil Datta, CEP Discussion Paper No. 2019 (<https://cep.lse.ac.uk/pubs/download/dp2019.pdf>).

Further reading

Rebecca Diamond, Tim McQuade and Franklin Qian (2019) 'The Effects of Rent Control Expansion on Tenants, Landlords, and Inequality: Evidence from San Francisco', *American Economic Review* 109 (9): 3365–94.

House of Lords Built Environment Committee (2022) 'Meeting Housing Demand'.

Andreas Mense, Claus Michelsen and Konstantin Kholodilin (2023) 'Rent Control, Market Segmentation, and Misallocation: Causal Evidence from a Large-Scale Policy Intervention', *Journal of Urban Economics* 134: 103513.

The UK left the EU's single market and customs union at the start of 2021, entering into the Trade and Cooperation Agreement with the EU. **Rebecca Freeman, Marco Garofalo, Enrico Longoni, Kalina Manova, Rebecca Mari, Thomas Prayer and Thomas Sampson** find that it is smaller UK firms that have been hit hardest, with a significant drop in their exports to the EU.

How Brexit affected the trade of UK firms

How has Brexit affected UK trade? Our new research studies this question using firm-level customs data on UK goods trade. Working with firm-level data allows us to provide a richer account of the impact of Brexit than is possible using more aggregated data, helping us uncover important differences in the effects of Brexit on small versus large firms.

We show that the UK's exit from the EU's single market and customs union at the start of 2021 led to immediate declines in exports and imports with the EU. But, we also find that firms responded to the shock in ways that dampened the decline in overall trade. While small firms were hardest hit, large firms did not experience a drop in exports. In addition, importers partly compensated for lower EU imports by sourcing more from outside the EU.

The referendum vote in June 2016 created substantial uncertainty, but did

not lead to any trade policy changes until January 2021 when the Trade and Cooperation Agreement (TCA) governing post-Brexit UK-EU relations came into force. The TCA is a zero-tariff, zero-quota free trade agreement. But, under the TCA the UK is no longer a member of the EU's single market or customs union, which has led to the reintroduction of a customs and regulatory border between the UK and the EU. We study the effect of Brexit on trade both during the period of uncertainty about UK-EU relations that lasted until the end of 2020, and following the introduction of the TCA.

The response to trade barriers was immediate

To identify the causal effect of Brexit on firm-level trade, we start by comparing changes in trade with the EU versus the rest of world (RoW) within firms from 2012-22. Our analysis controls for firm-specific

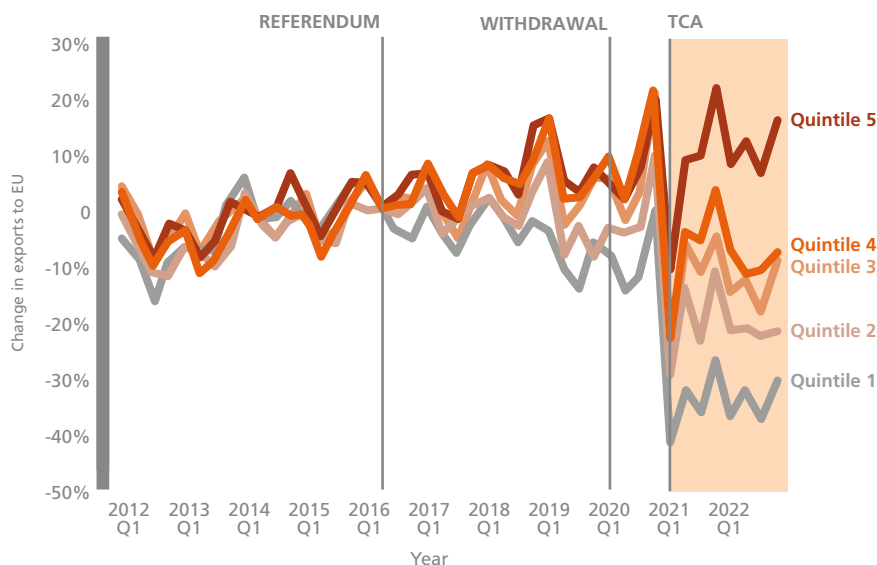
shocks that affect trade with all countries and for region-specific shocks to export supply and import demand. We find no evidence of a significant decline in either exports or imports with the EU relative to the RoW prior to the implementation of the TCA in 2021. This finding implies that uncertainty and anticipation of future increases in trade barriers following the referendum did not reduce relative trade with the EU.

By contrast, we find that trade responds immediately when the TCA comes into effect in 2021. We estimate that both exporters and importers experienced a sharp and sustained fall in trade with the EU relative to the RoW from the start of 2021 onwards. This fall is driven by smaller firms, particularly for exports. Splitting firms into quintiles, defined by firm employment, we estimate that the TCA reduced relative EU exports by 30% for the smallest quintile of firms and 15% for the middle quintile,



Figure 1:

Estimated changes in firm exports to EU versus the rest of the world, by firm size quintile



Notes: Event-study estimates showing percent changes in trade with EU relative to the rest of the world by firm size quintile. Firm size measured using average employment between 2013 q1 and 2015 q4. Quintile 1 denotes the smallest firms and quintile 5 the largest firms.

Source: Freeman et al, 2024.

but did not have a statistically significant effect on exports among the largest quintile. Figure 1 shows estimated changes in EU relative to RoW exports over time by size quintile – the sharp drop in exports from 2021 onwards is immediately visible for firms in the bottom four quintiles

Although the direct effect of Brexit was to increase trade barriers with the EU, it may also have indirectly affected UK trade with the RoW. Indirect effects could arise through many channels including supply chain linkages between trade with the EU and trade with the RoW, interdependencies across origins in import sourcing decisions, scale effects and capacity constraints in production. To study whether Brexit had such indirect effects, we compare changes over time in trade with the RoW across firms with differential exposure to trade with the EU prior to the referendum.

We find no evidence that the TCA indirectly affected UK exports to the RoW. This null result implies that the decline in exports to the EU relative to the RoW described above was caused by a fall in exports to the EU. But, we do estimate that firms with higher pre-referendum EU imports increased their imports from the RoW under the TCA. This implies that the TCA caused importers to substitute from EU to RoW suppliers, which

highlights the importance of cross-origin interdependencies in import sourcing. That said, the increase in imports from the RoW does not fully compensate for the decline in imports from the EU, meaning that the TCA reduced total imports from all origins.

The smallest export firms were hardest hit

We also study whether Brexit led some UK firms to exit foreign markets altogether. Our analysis shows that the TCA reduced the survival rate for exporters to the EU and importers from the EU, especially for smaller firms. We interpret this as evidence that the TCA increased fixed trade costs. Our estimates imply that the TCA caused around 16,400 firms (or 14% of EU exporters) to stop exporting to the EU.

What do our results imply about the impact of the TCA on overall UK trade? Based on a back-of-the-envelope aggregation exercise, we conclude that the TCA reduced worldwide UK goods exports by 6.4% (due to a 13.2% fall in exports to the EU) – an estimated £27bn – and worldwide goods imports by 3.1%, equivalent to £20bn.

For exports, the relatively small aggregate impact reflects our finding that the negative effects of the TCA were concentrated on smaller firms, while the

largest firms successfully maintained export levels. For imports, substitution towards imports from outside the EU partially offset reduced EU imports. These firm-level adaptations to the customs and regulatory barriers introduced by the TCA increased the resilience of overall trade to Brexit in the short run.

There are three important caveats to our findings. First, we only study trade. Firm profitability may be affected differently to trade, for example if Brexit makes sustaining a given level of trade activity more costly. Second, we only study short-term effects during the first two years of the TCA. In the medium to long term, trade losses may diminish if firms can reoptimise their buyers and suppliers, or deepen if firm productivity, supply chains and export diversification suffer over time. Third, we only study goods trade, and do not analyse trade in services, which constitutes nearly half of UK trade.

Any views expressed are solely those of the authors and do not represent the views of the Bank of England or state its policy. This paper should not be reported as representing the views of the Bank of England, or members of the Monetary Policy Committee, Financial Policy Committee or Prudential Regulation Committee.

This article summarises 'Deep Integration and Trade: UK Firms in the Wake of Brexit' by Rebecca Freeman, Marco Garofalo, Enrico Longoni, Kalina Manova, Rebecca Mari, Thomas Prayer and Thomas Sampson, CEP Discussion Paper No. 2066 (<https://cep.lse.ac.uk/pubs/download/dp2066.pdf>). A version of it first appeared on *LSE British Politics and Policy* (<https://blogs.lse.ac.uk/politicsandpolicy/how-brexit-affected-the-trade-of-uk-firms/>).

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Discussing the economics of education and skills

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Michela Carlana (Harvard Kennedy School)

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