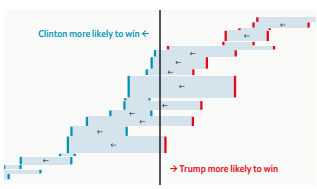
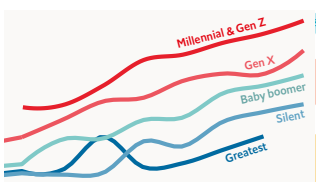
# A year in Graphic detail

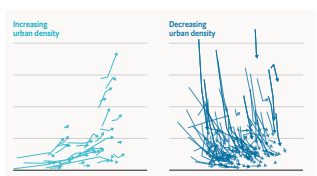
October 2018 - December 2019

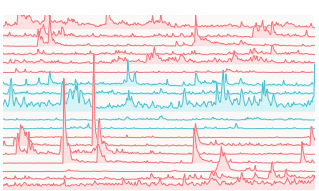
economist.com/graphic-detail

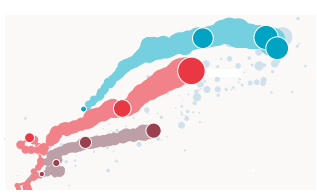
The Economist

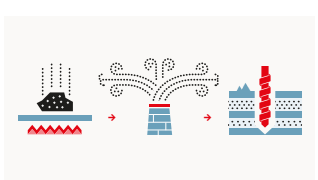


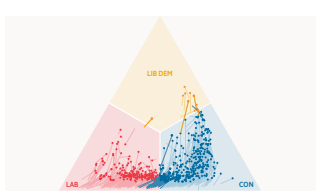









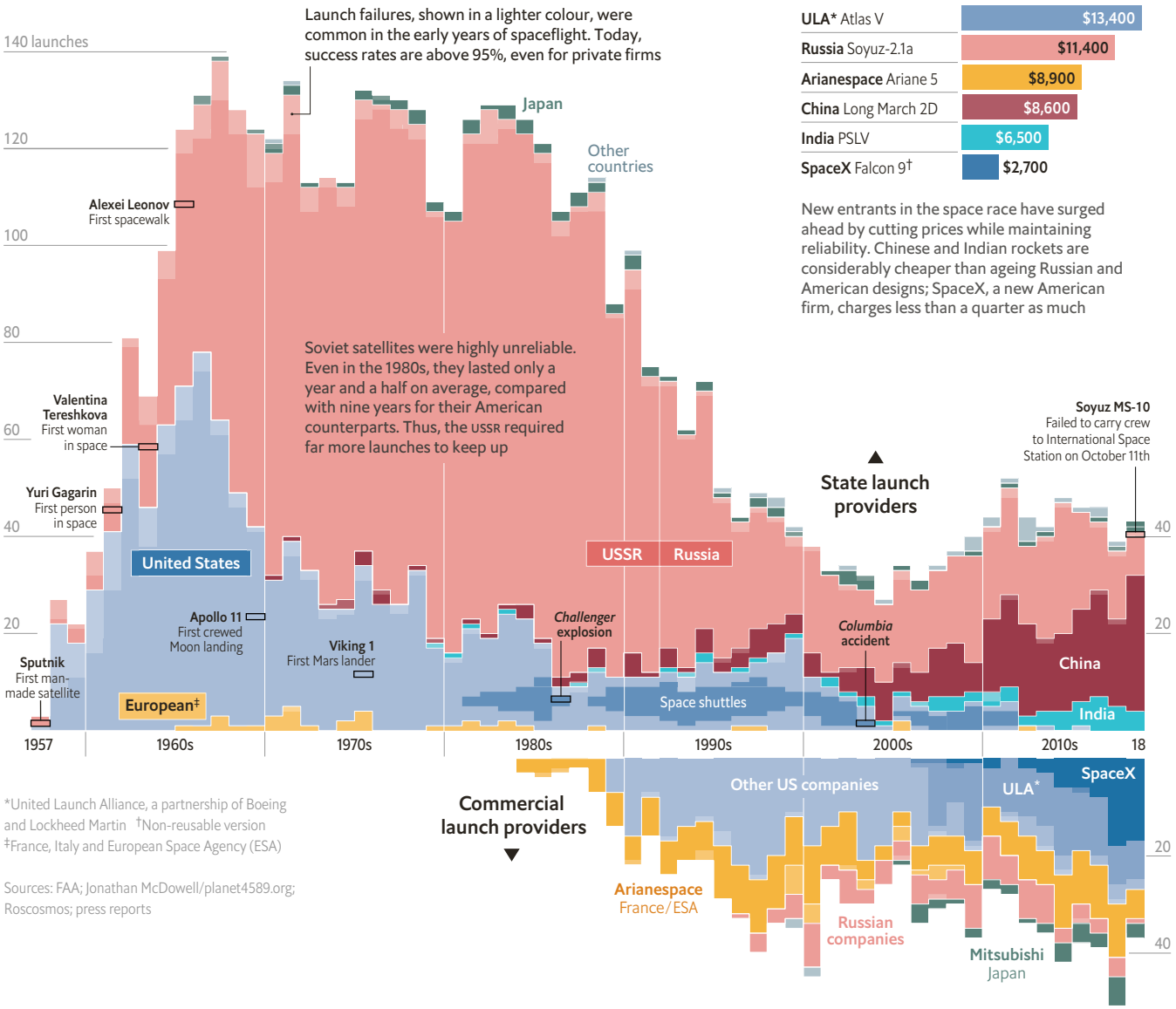

**In October 2018,** we launched Graphic detail, a new print section in *The Economist* dedicated to data journalism.

The digital versions of these articles are available at **economist.com/graphic-detail**, and in many cases offer a fuller, interactive experience.

But these pieces were conceived and designed primarily for the printed page. This document is a way of showing our digital readers the analogue origins of our best data journalism this year.

We look forward to providing more of the same in 2020.

**Space launches**
To Earth orbit or higher, at October 17th 2018




*United Launch Alliance, a partnership of Boeing and Lockheed Martin †Non-reusable version
‡France, Italy and European Space Agency (ESA)

Sources: FAA; Jonathan McDowell/planet4589.org; Roscosmos; press reports

**Cost to reach low-Earth orbit in 2018**
$ per kg of cargo, principal launch vehicle




New entrants in the space race have surged ahead by cutting prices while maintaining reliability. Chinese and Indian rockets are considerably cheaper than ageing Russian and American designs; SpaceX, a new American firm, charges less than a quarter as much

A modern space race

# The next generation

**Private businesses and rising powers are replacing the cold-war duopoly**

Some 4,500 satellites circle Earth, providing communications services and navigational tools, monitoring weather, observing the universe, spying and doing more besides. Getting them there was once the business of the superpowers' armed forces and space agencies. Now it is mostly done by companies and the governments of developing countries.

During the early years of the space race reaching orbit was hard. Between 1957 and 1962, 32% of American launches and 30% of Soviet ones failed. Accidents still happen: on October 11th a Russian rocket aborted its ascent shortly after launch (both crew members landed unharmed). Only states could assume such risks—and even if American firms had wanted to bear them, its government would not let them on national-security grounds. Companies eager to send objects into space, including telecoms firms, had to hitch a ride with NASA.

This changed when European countries started building launchers through a mostly state-owned company called Arianespace, which touted for custom among satellite-makers around the world. When the space shuttle *Challenger* exploded in 1986, NASA got out of the satellite-launching business. It and, later, the Pentagon became new customers for private launch firms, alongside the satellite operators.

In the past decade the West's space-launch market has become more competitive thanks to an innovative new entrant, SpaceX. But state-run programmes still lead the way in emerging markets. In 2003 China became the third country to put a person into orbit; India plans to follow suit in 2022. Both sell launch services to private clients. China did legalise private space flight in 2014, but no companies based there have yet reached orbit on their own.

Like their cold-war predecessors, these Asian titans have strategic goals as well as a thirst for publicity. They need independent access to space for communication, intelligence and navigation. However commercialised space gets, the competition will never be solely economic. ■

The Chinese century

# Well under way

**Many trends that appear global are in fact mostly Chinese**

When scholars of international relations predict that the 2000s will be a "Chinese century", they are not being premature. Although America remains the lone superpower, China has already replaced it as the driver of global change.

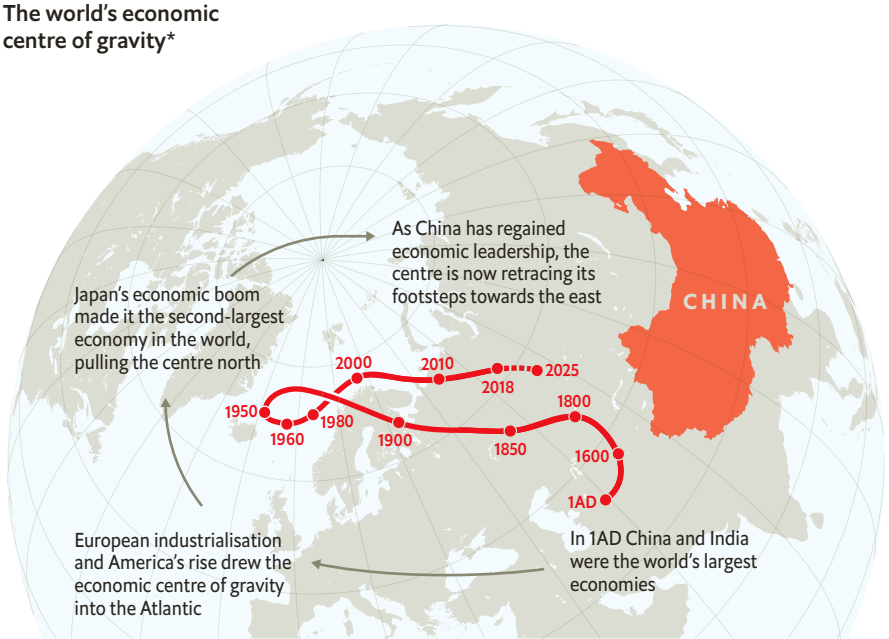
There is one economic metric on which China already ranks first. Measured at market exchange rates, China's GDP is still 40% smaller than America's. However, on a purchasing-power-parity (PPP) basis, which adjusts currencies so that a basket of goods and services is worth the same amount in different countries, the Chinese economy became the world's largest in 2013. Although China is often grouped with other "emerging markets", its performance is unique: its GDP per person at PPP has risen tenfold since 1990. In general, poorer economies grow faster than rich ones, because it is easier to "catch up" when starting from a low base. Yet in other countries that were as poor as China was in 1990, purchasing power has merely doubled.

China's record has exerted a "gravitational pull" on the world's economic output. *The Economist* has calculated a geographic centre of the global economy by taking an average of each country's latitude and longitude, weighted by their GDP. At the height of America's dominance, this point sat in the north Atlantic. But China has tugged it so far east that the global centre of economic gravity is now in Siberia.

Because China is so populous and is developing so quickly, it is responsible for a remarkable share of global change. Since the start of the financial crisis in 2008, for example, China has accounted for 45% of the gain in world GDP. In 1990 some 750m Chinese people lived in extreme poverty; today fewer than 10m do. That represents two-thirds of the world's decline in poverty during that time. China is also responsible for half of the total increase in patent applications over the same period.

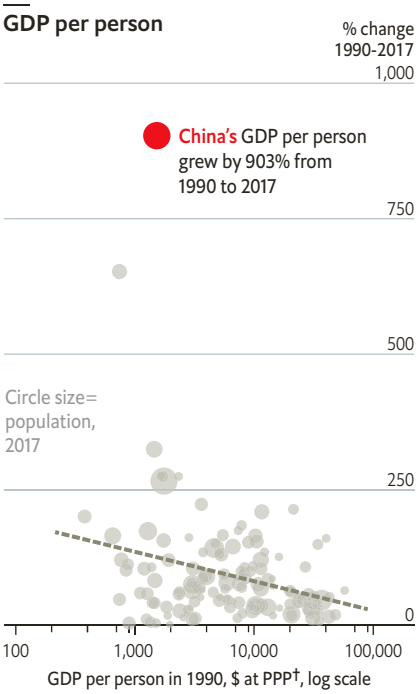
For all its talk of a "peaceful rise", China has steadily beefed up its military investment—even as the rest of the world cut back after the end of the cold war. As a result, the People's Liberation Army accounts for over 60% of the total increase in global defence spending since 1990. And all of this growth has come at a considerable cost to the environment: China is also the source of 55% of the increase in the world's carbon emissions since 1990. ■

## The world's economic centre of gravity*



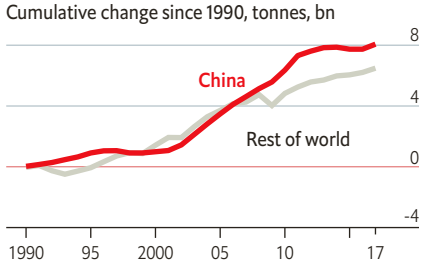

*The economic centre of the globe is calculated using an average of countries' locations weighted by their GDP

## GDP per person



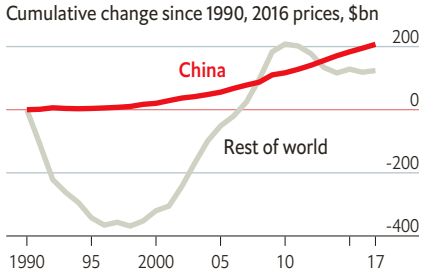

## $CO_2$ emissions

Cumulative change since 1990, tonnes, bn



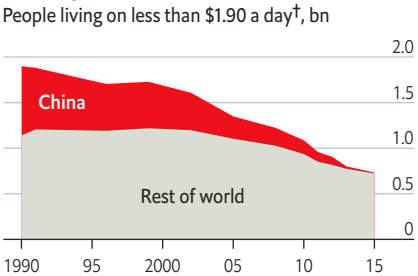

## Military spending

Cumulative change since 1990, 2016 prices, $bn



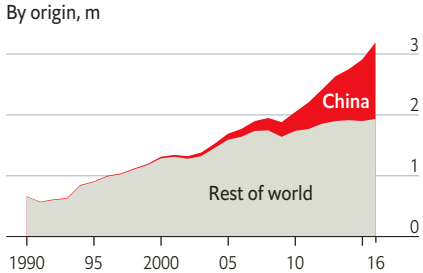

## Poverty

People living on less than $1.90 a day†, bn




## Patent applications

By origin, m




Sources: Economist Intelligence Unit; Global Carbon Project; Maddison Project Database; SIPRI; World Bank; World Intellectual Property Organisation; *The Economist*

†Prices at 2011 purchasing-power parity

The American electorate

# All politics is identity politics

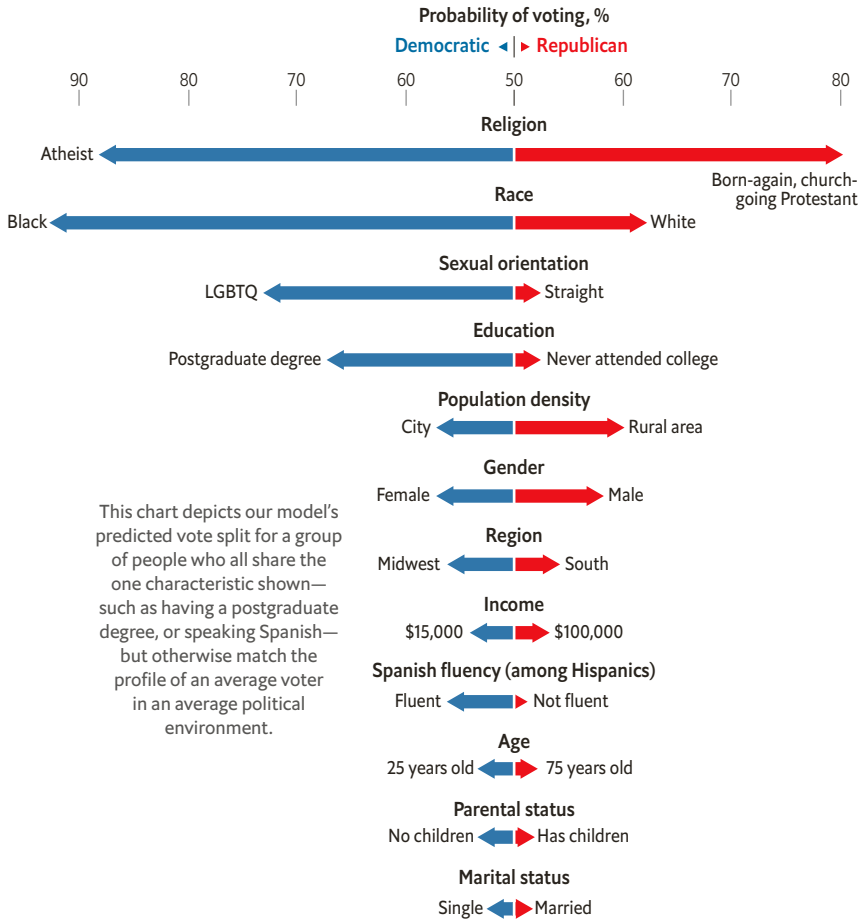
**Religion, not race, is the best single predictor of voting preferences**

AMERICA'S FOUNDING FATHERS envisioned a republic in which free-thinking voters would carefully consider the proposals of office-seekers. Today, however, demography seems to govern voters' choices. Since April 2017 *The Economist* and YouGov, a pollster, have surveyed 1,500 Americans each week. We have built a statistical model to estimate the odds of how each respondent will vote in next week's mid-term elections.

Polling of voting sub-groups can be misleading. City-dwellers are usually liberal. Is that because of where they live, or because they tend to be better educated and are less likely to be white than countryfolk? Our model measures each variable in isolation. Even among people of the same race and schooling, urbanites are more Democratic-leaning. It also considers how variables affect each other. For example, single women are more liberal than married ones, whereas this gap is negligible among men. Of the 12 factors in the model, the most important is religion. Atheists are even more likely to be Democrats than evangelical Protestants are to be Republicans. ■

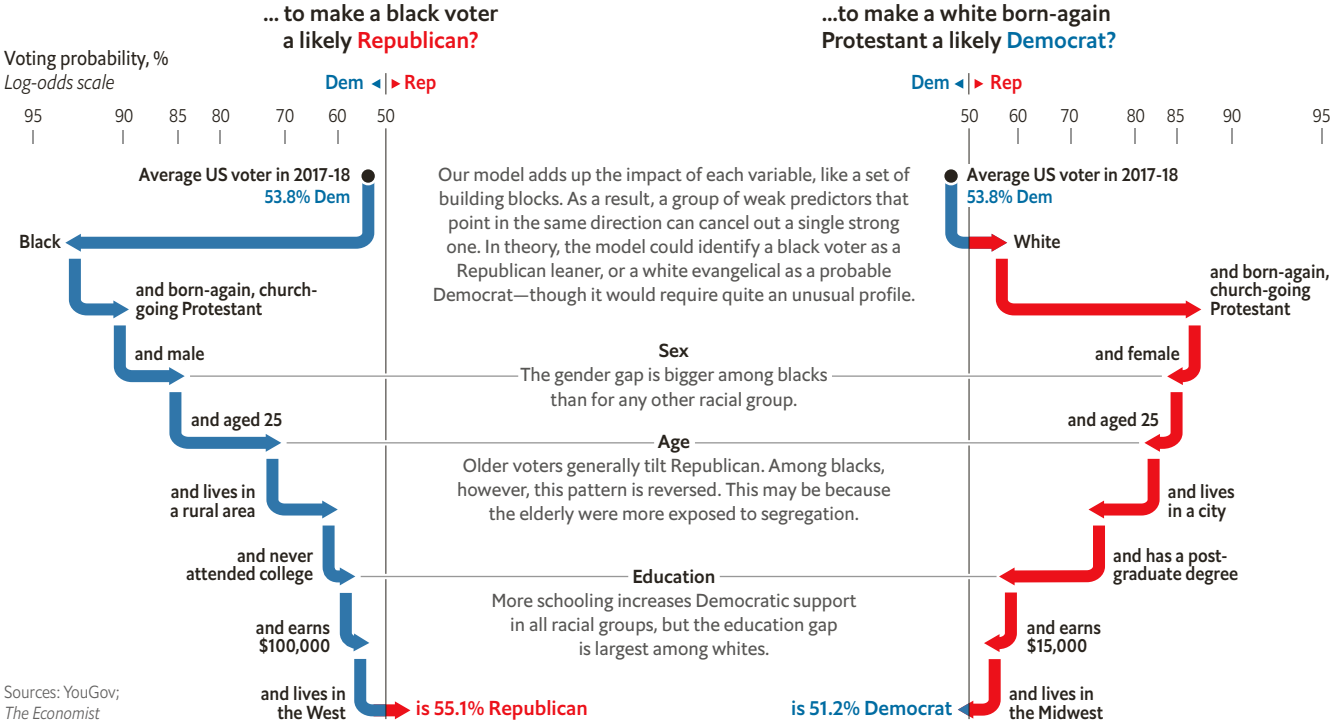
**What has the biggest effect on congressional voting intention?**

Strongest predictors by demographic category



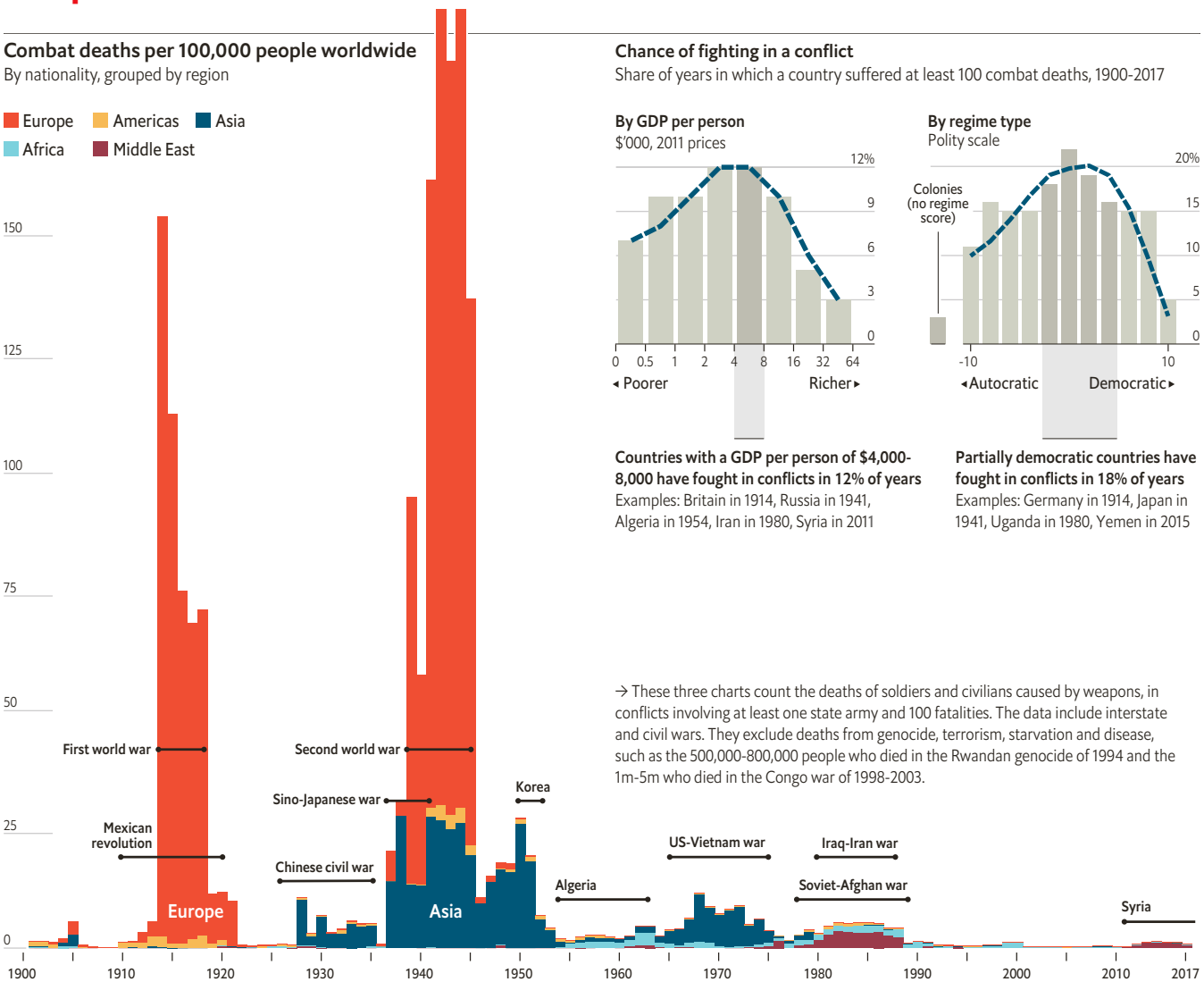

This chart depicts our model's predicted vote split for a group of people who all share the one characteristic shown—such as having a postgraduate degree, or speaking Spanish—but otherwise match the profile of an average voter in an average political environment.

## What would it take...




Sources: YouGov; *The Economist*

**Combat deaths per 100,000 people worldwide**
By nationality, grouped by region




**Chance of fighting in a conflict**
Share of years in which a country suffered at least 100 combat deaths, 1900-2017

**By GDP per person**
$'000, 2011 prices




**Countries with a GDP per person of $4,000-8,000 have fought in conflicts in 12% of years**
Examples: Britain in 1914, Russia in 1941, Algeria in 1954, Iran in 1980, Syria in 2011

**By regime type**
Polity scale




**Partially democratic countries have fought in conflicts in 18% of years**
Examples: Germany in 1914, Japan in 1941, Uganda in 1980, Yemen in 2015

→ These three charts count the deaths of soldiers and civilians caused by weapons, in conflicts involving at least one state army and 100 fatalities. The data include interstate and civil wars. They exclude deaths from genocide, terrorism, starvation and disease, such as the 500,000-800,000 people who died in the Rwandan genocide of 1994 and the 1m-5m who died in the Congo war of 1998-2003.

Sources: Peace Research Institute Oslo; Uppsala Conflict Data Program; Centre for Systemic Peace; Maddison Project Database; iCasualties.org; World Bank; *The Economist*

Conflict and development

# No man's land

**Partially democratic countries fight in wars most often**

When the first world war ended on November 11th 1918, David Lloyd George, Britain's prime minister, told Parliament: "I hope we may say that thus, this fateful morning, came to an end all wars." History proved him wrong. But 100 years on, the world is far more peaceful. Fewer than one in 100,000 people have died in combat per year since 2000—one-sixth the rate between 1950 and 2000, and one-fifteenth of that between 1900 and 1950. Why?

The simplest explanation is the advent of nuclear weapons, which deter major powers from fighting each other. But wars have declined among non-nuclear states, too. Another reason might be the spread of democracy and global norms. Bruce Russett and John Oneal, two academics, have found that countries that are democratic, trade heavily and belong to lots of international bodies fight each other less often than authoritarian, isolationist states do.

*The Economist* has analysed all international and civil wars since 1900, along with the belligerents' wealth and degree of democratisation (assigning colonies to their own category). We counted all conflicts involving national armies in which at least 100 people per year were killed, excluding deaths from terrorism, massacres of civilians outside combat, starvation or disease.

The data show a strong correlation between democracy and peace, with a few exceptions. (The United States has been quite bellicose, and its advanced democracy did not prevent a civil war in 1861 that claimed more American lives than any conflict since.) Moreover, the relationship does not seem to be linear. The countries most prone to wars appear to be neither autocracies nor full democracies, but rather countries in between. A similar finding applies to prosperity. Middle-income countries are more warlike than very poor or rich ones.

What causes such states' belligerence? Warfare is expensive, and citizens in tyrannies struggle to organise uprisings. Some studies find that civil wars are more common after sudden regime changes, which cause instability. Perhaps a little political competition or wealth make it easier to take up arms. All this might explain why the bloodiest battles since 1900 have shifted from Europe, to Asia, to the Middle East and Africa. If partial democracy is linked to conflict, recent backsliding in countries like Turkey looks even more worrying.

Even a bit of democracy, however, saves lives overall—because empires and dictators are more likely to starve and slaughter their subjects. Counting man-made famines and genocides, colonial and undemocratic powers have caused 250m premature deaths since 1900—five times the death toll from combat in all wars combined. ■

Wildfires

# Burning out

**Climate change makes fires worse, but agricultural development limits them**

PARADISE, A SMALL Californian town, looks like hell. Some 80-90% of its homes have been incinerated by the state's deadliest-ever wildfire, which so far has killed 48 people and left over 200 missing (see United States section). Measured by area burned, nine of California's ten worst recorded fires have occurred since 2000.

President Donald Trump says that poor forest management is the sole cause of the blaze. Scientists beg to differ. John Abatzoglou and Park Williams, two academics, have shown that temperature and dryness exacerbate wildfires in the western United States. Without global warming, they reckon, only half as much woodland would have burned between 1984 and 2015.

America is not the only rich country in danger. Since 2016 Portugal and Greece have suffered their most lethal wildfires in history, killing over 200 people. One study found that if global temperatures reach 3°C above pre-industrial levels, the area burned in southern Europe would double.

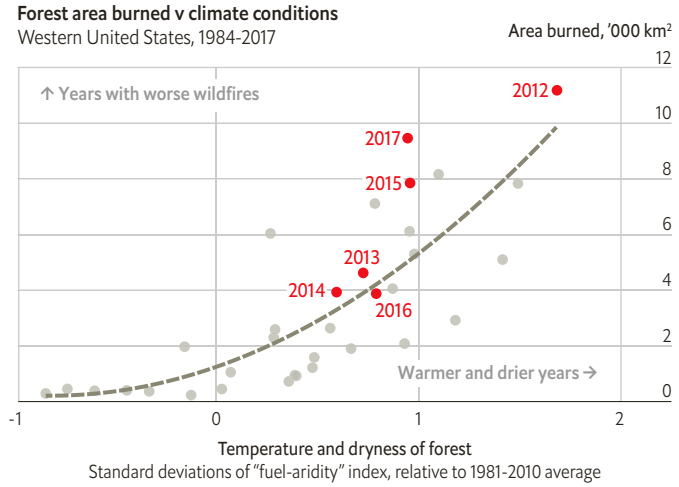
Yet despite the attention paid to such disasters, their rising frequency in parts of the West is an exception to the global trend. Most wildfires occur in developing countries, where they are declining. According to Niels Andela of NASA, the world's total area on fire fell by 24% from 1998 to 2015.

Two main reasons are agriculture and stronger property rights. Two-thirds of the world's burned area is in Africa, a dry, hot continent where pastoralists have often used fire to clear land. Slash-and-burn methods remain common in parts of Asia as well. The growth of modern farming is helping to put blazes out: dividing land into pastures and fields breaks up terrain and makes it harder for infernos to spread. Settled people who have things to lose prefer fighting fires to starting them.

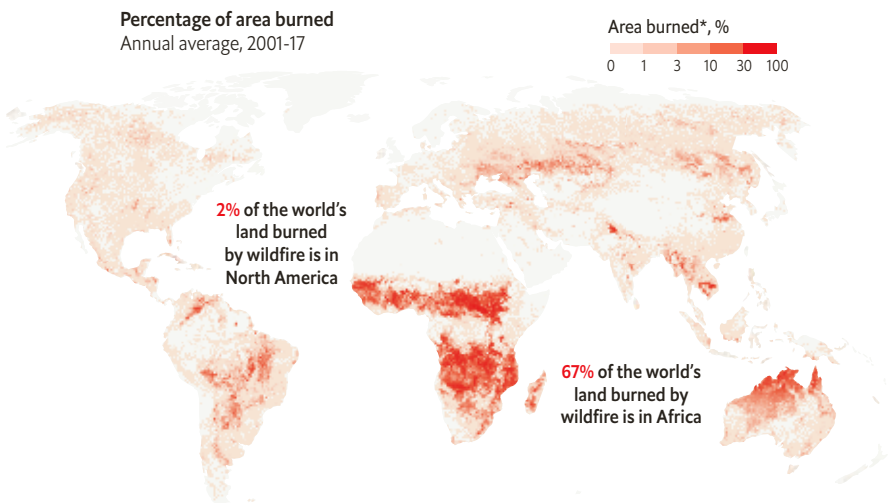
This trend is so robust that fire is expected to keep fizzling out. Across various scenarios of global warming and population growth, Wolfgang Knorr of Sweden's Lund University finds that the fire-reducing impact of changing land use generally outweighs the effect of rising temperature.

This will save lives. Wildfires cause 330,000 premature deaths a year by spewing smoke, far more than by trapping victims. People moving onto fire-prone land put themselves at risk. But by keeping flames in check, they make the air more breathable for everyone else. ■

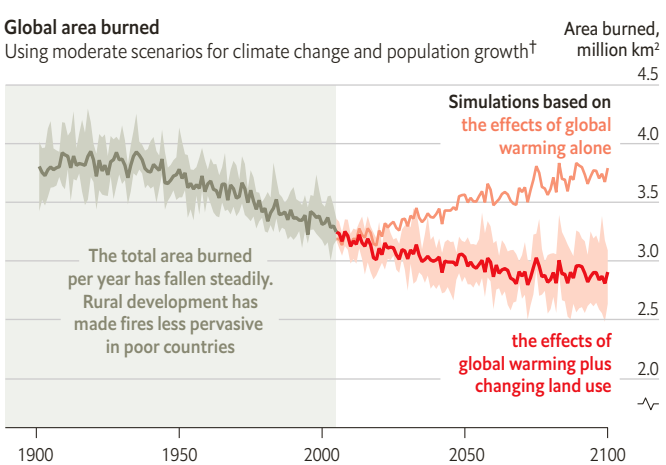
**→ A warmer climate has made wildfires in America more severe**




**→ But most of the world's wildfires happen in poorer regions**

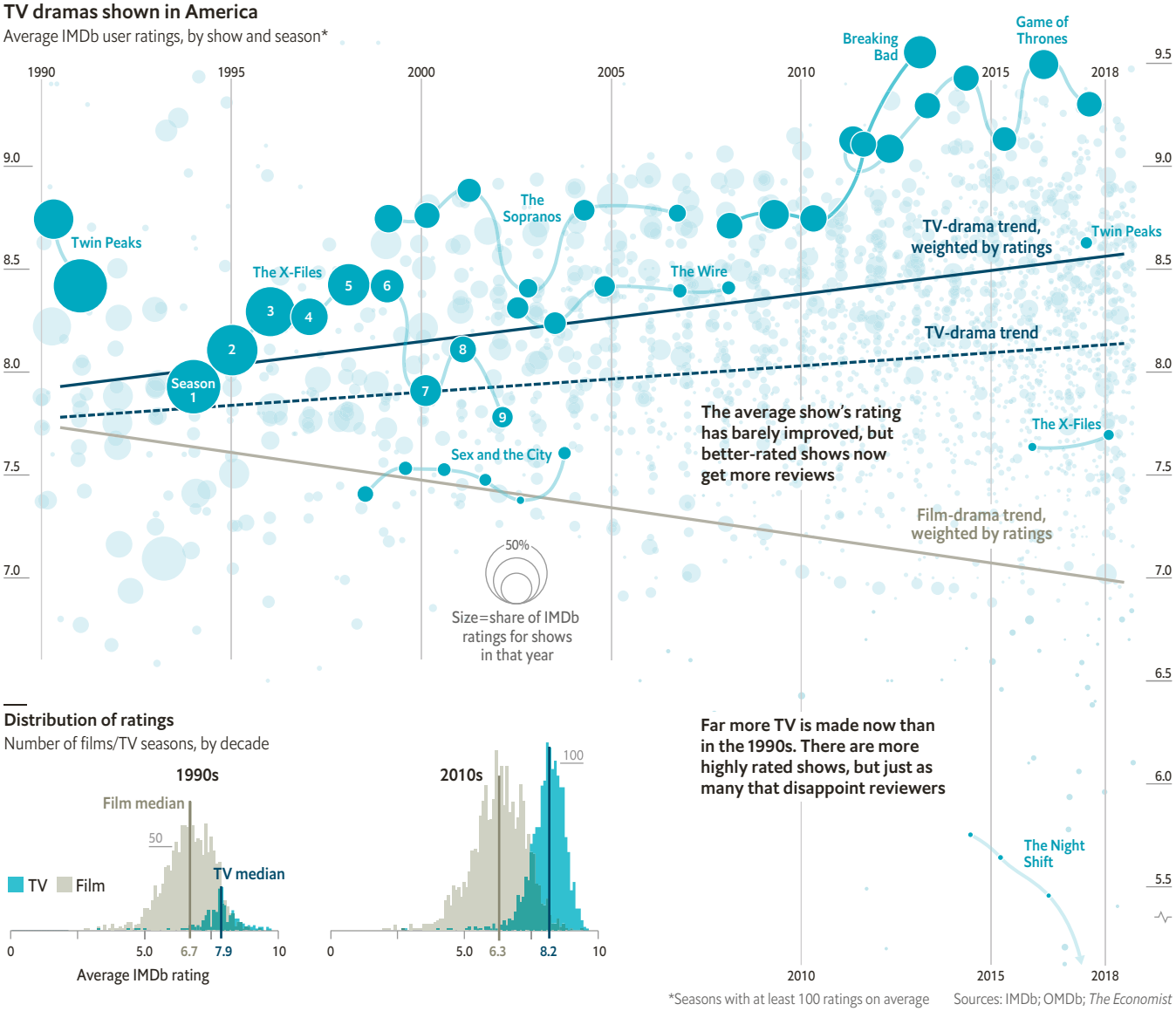



**→ Despite global warming, changing land use is reducing fire damage**




Sources: Louis Giglio, University of Maryland; Niels Andela, NASA; Park Williams, Columbia University; Wolfgang Knorr, Lund University

*In 28km² blocks †Representative concentration pathway 4.5 and shared socioeconomic pathway 2




Television in America

# The end of channel surfing

**TV's golden age is real. But for every "Breaking Bad", more shows are just bad**

In 2011 Alexis Pichard, a French academic, declared that American television was enjoying a "new golden age", marked by vast improvements in cinematography and storytelling. Although critics disagree over when TV emerged as a serious art form, there is consensus that shows like "The Wire" and "Breaking Bad" have brought new sophistication to the small screen.

The picture that emerges from viewers—or at least those who post reviews on IMDb, an online database—is a bit fuzzier. Among dramas from the 1970s with at least 100 ratings, the median show that aired in America had an average score of 7.85 out of ten. In the 1990s, this figure was the same. And since 2010, it has risen to 8.17—a tiny gain. If you were to choose at random one drama from the 2010s and one from the 1990s, the modern one would score worse than the older one 37% of the time.

Does this paltry pace of progress mean that the much-touted golden age of television is much ado about nothing? Not necessarily. In IMDb users' opinions, far more great TV is made today than ever before. Since 2010, 73 different seasons of dramas have exceeded an average rating of 9.0. In the 1990s, only 11 did. The reason why the average has barely budged is that the onslaught of new shows includes plenty of rubbish. For every brilliant "Game of Thrones", chronic disappointments like "The Night Shift", a mediocre medical drama, are only a few clicks away.

Fortunately for audiences, streaming platforms make avoiding such duds far easier. These services' recommendation systems guide viewers to content they are likely to enjoy. Sure enough, the highest-rated shows now get the most reviews. From 1993 to 2013, the average IMDb rating of a typical show rose by just 0.26 points. But the average weighted by the number of ratings climbed much more, by 0.89 points. That suggests viewers are finding shows they like far more often today than in the past.

This upward trend may also result from changes in the reliability of the data. Most dramas reviewed on IMDb are modern, and many ratings of older ones were posted years after the shows aired. Yet even if TV's golden age is over-hyped, the medium is still viewers' best bet. IMDb users give the average film drama a rating nearly as bad as those of the worst dramas on TV. ■

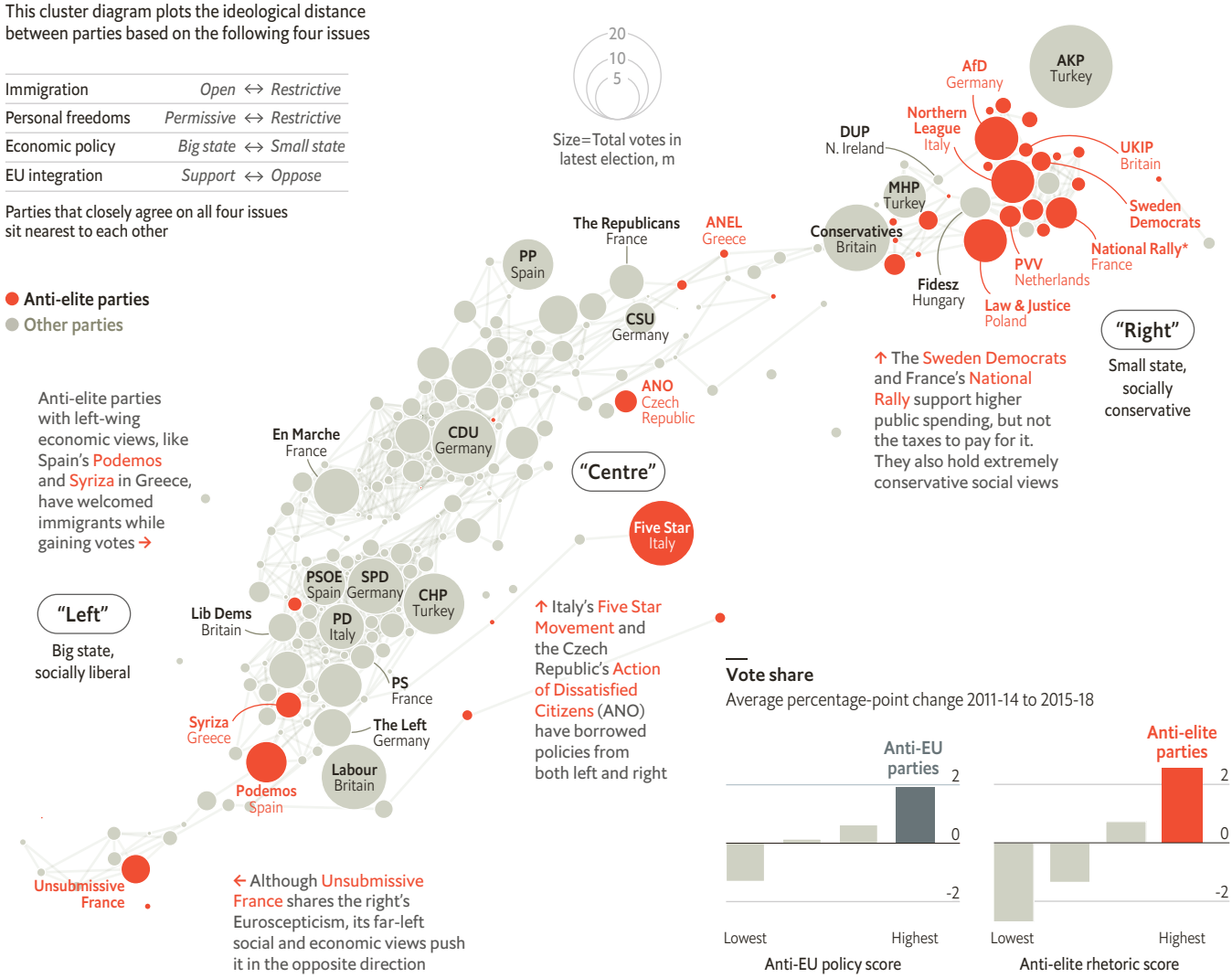
To explore an interactive version of this chart and search by TV show, visit **Economist.com/ustv**

## European anti-elite parties support different policies

This cluster diagram plots the ideological distance between parties based on the following four issues

| | |
|---|---|
| Immigration | *Open* ↔ *Restrictive* |
| Personal freedoms | *Permissive* ↔ *Restrictive* |
| Economic policy | *Big state* ↔ *Small state* |
| EU integration | *Support* ↔ *Oppose* |

Parties that closely agree on all four issues sit nearest to each other




*Formerly National Front Sources: Chapel Hill Expert Survey; ParlGov

Populism in Europe

# Aux armes, citoyens!

### Voters have turned against elites and the EU, but agree on little else

MATTEO SALVINI, the head of the Northern League, a populist party that forms part of Italy's governing coalition, has a pithy explanation for the global rise of movements like his. "It is a common factor," he says. "The confrontation of the people versus the elite." Scholars would agree. Since 1999 the University of North Carolina at Chapel Hill has surveyed political scientists about European parties' policy positions and rhetoric, yielding ideological ratings for each party on various issues. Sure enough, the attribute most correlated with gaining votes since 2014 has been criticism of elites. (The ratings in the survey, conducted roughly every four years, closely match those that voters give to parties when polled, as well as ideological scores that can be derived from manifestos.)

What has drawn voters to such parties? To identify what else they might share, *The Economist* has used a statistical clustering method to calculate the ideological distances between 244 European parties. Our analysis is based on Chapel Hill's scores on four issues: social liberalism, economic policy, immigration and the EU.

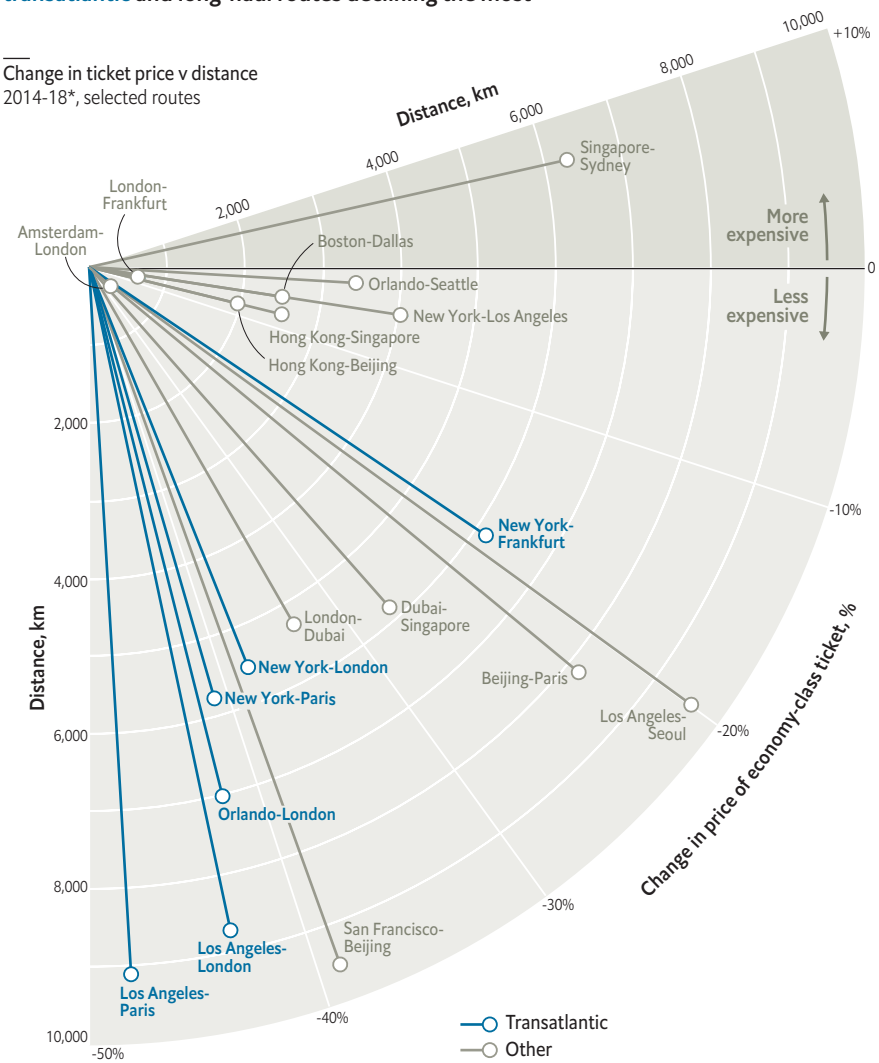
A familiar left-to-right spectrum emerged for the first three subjects. Parties with free-market economic views also tended to endorse tighter limits on immigration and on personal freedoms. The reverse was broadly true on the left.

Mr Salvini's League landed on the right, as did most parties with high scores for anti-elite rhetoric. However, some of the fastest-growing upstarts—such as Syriza in Greece, Podemos in Spain and the Five Star Movement in Italy—sat in the middle or on the left. Because of this ideological diversity, no statistically significant relationship exists between the change in a party's vote share from 2014-18 and its views on immigration, social liberalism or economic intervention by the state.

However, one policy area neatly cleaved off the "populist" parties from their "establishment" rivals. The EU is often described as an elite-driven project. So it is little surprise that anti-elite parties with little else in common generally rail against European integration—and that hostility to the EU predicts increases in vote shares nearly as well as anti-elitism does. Voters seem eager to tear down the old order, but do not agree on what the new one should be. ■

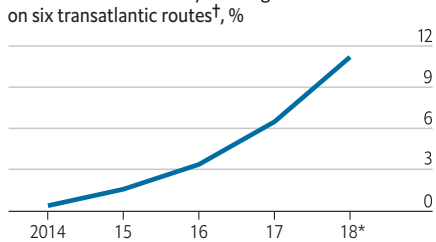
**Most airfares have fallen since 2014, with prices on transatlantic and long-haul routes declining the most**

Change in ticket price v distance
2014-18*, selected routes




**Discount airlines are flying more long routes, increasing competition**

Share of seats offered by Norwegian on six transatlantic routes†, %

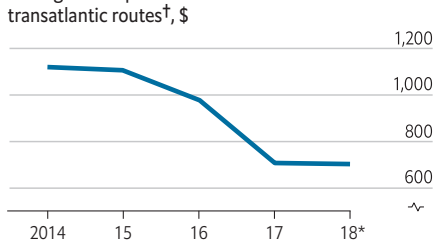



**The oil-price bust helped airlines cut fares, but fuel costs have doubled since 2016**

Jet fuel, $ per litre

**As a result, fares have plateaued after a steep decline**

Average ticket price on six transatlantic routes†, $




Sources: Expedia; Chris Tarry (CTAIRA); CapStats; S&P Global Platts *Comparing equivalent quarters †Routes highlighted in blue

Flight prices

# Prepare for landing

**Fares have plunged on long routes, but are now in a holding pattern**

If you have booked a flight recently and been surprised by how cheap your ticket was, you are not alone. Airfares have been falling for years. Between 1995 and 2014 they halved in real terms, according to the International Air Transport Association (IATA). But in 2014 that descent became a nosedive. In the following two years, the average airfare dropped by nearly a quarter.

Curious passengers will find no public record of average prices paid on international routes. However, Expedia, a bookings firm, has given *The Economist* data for tickets sold on its platform for some popular itineraries. The biggest price falls have been on lengthy journeys. Routes longer than 5,000km (3,100 miles) have generally seen price drops of 30% on economy-class seats, approaching 50% on some transatlantic tickets. Fares on most trips shorter than 5,000km have fallen by less than 10%.

What explains the sharp drop on long flights? One factor has been the price of jet fuel, which makes up a higher share of costs on such routes. It fell from $0.81 per litre to $0.22 between 2014 and 2016.

But falling costs alone do not always lead to lower prices. The fuel slump coincided with increasing long-haul competition from low-cost carriers. Budget airlines swarmed onto regional routes in Europe and America 20 years ago. Now, with help from more fuel-efficient planes, they have turned their sights on longer journeys that were once out of reach. On transatlantic routes, Norwegian has crammed customers into sparkly new Boeing Dreamliners, offering return tickets from London to New York for as little as £260 ($330). Incumbents have had to cut their prices to protect their market share.

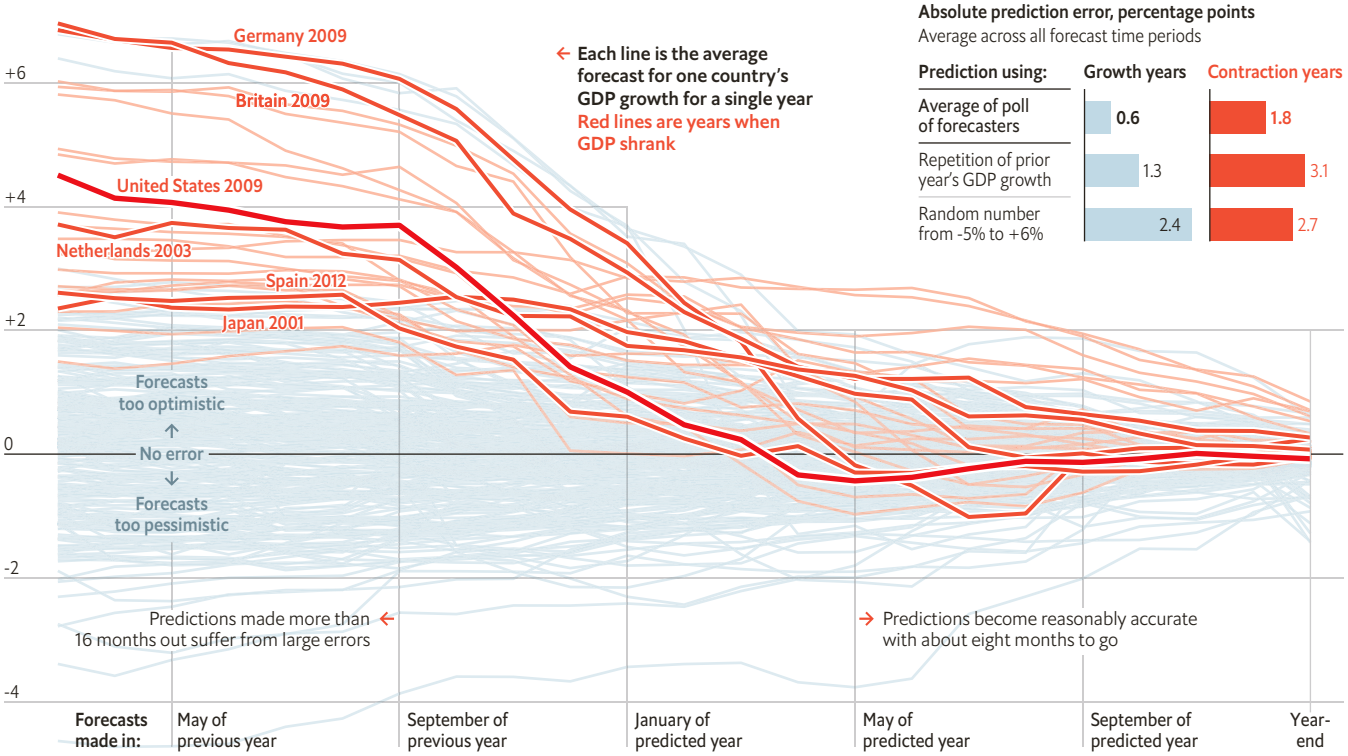
In Asia state-owned Chinese carriers have also undercut their rivals, because of hefty subsidies and a threefold increase in passengers in the past decade. Those cheap tickets mean that China is starting to rival the Gulf as a convenient hub for European visitors flying on to the rest of Asia.

But the downward spiral has stalled. Despite a recent sell-off, fuel prices have doubled since early 2016. Other costs are rising by 5% a year, notes Chris Tarry, a consultant. IATA expects profits to fall by 11% in 2018. That gives airlines less scope to cut fares, which have been flat for a year. After a long descent, prices have levelled out. ■

**While economic forecasters struggle to predict downturns...**

GDP growth forecasts for calendar years, difference from actual growth, percentage points

Average of *The Economist* poll of forecasters, 15 rich-world countries, 2000-17




**...their projections are better than simplistic alternatives**

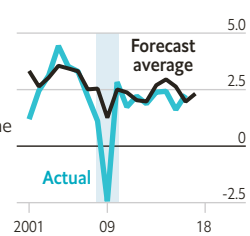
**Absolute prediction error, percentage points**

Average across all forecast time periods

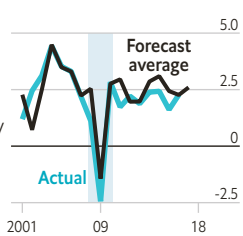



**United States calendar-year GDP forecasts,** % change on previous year

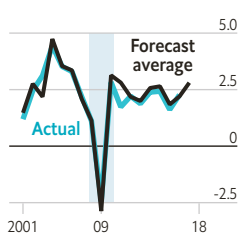
Forecasts made in **September for the following year** are clustered around 2.5%. In 2008, they missed the looming contraction




By **January of the year being predicted,** forecasters are bolder. But even after Lehman Brothers collapsed, they undershot the decline




Only in **May of the year being predicted** do forecasters hit the mark solidly. By that point in 2009, they correctly projected the bottom




Sources: IMF; *The Economist* poll of forecasters

Economic forecasting

# The worst except for all the others

### GDP predictions are fairly reliable—but only in the short term

Some investors worry that America will face a recession in the next few years, after one of the longest expansions on record. Stock indices have fallen by 10% since early October. Yields on short-term government bonds exceed those of some longer-dated ones, often a harbinger of a downturn. Despite this, economic forecasters project GDP growth of about 2% in 2020.

How much confidence should one have in these predictions? For the past 20 years *The Economist* has kept a database of projections by banks and consultancies for annual GDP growth. It now contains 100,000 forecasts across 15 rich countries. In general, they fared well over brief time periods, but got worse the further analysts peered into the future—a trend unsurprising in direction but humbling in magnitude. If a recession lurks beyond 2019, economists are unlikely to foresee it this far in advance.

Economies are fiendishly complex, but forecasters usually predict short-term trajectories with reasonable accuracy. Projections made in early September for the year ending four months later missed the actual figure by an average of just 0.4 percentage points. Errors rose to 0.8 points when predicting one year out. But over longer horizons forecasts performed far worse. With 22 months of lead time, they misfired by 1.3 points on average—no better than repeating the previous year's growth rate.

The biggest errors occurred ahead of GDP contractions. The average projection 22 months before the end of a downturn year missed by 3.7 points, four times more than in other years. In part, this is because growth figures are "skewed": economies usually expand slowly and steadily, but sometimes contract sharply. As a result, forecasters seeking to predict the most likely outcome expect growth. However, they adjust too slowly even once bad news arrives, says Prakash Loungani of the IMF. That suggests they are prone to "anchoring"—over-weighting previous expectations—or to "herding" (keeping their predictions near the consensus).

If forecasters displayed such biases consistently, an aggregator could beat the crowd by granting more weight to those with good records. But top performers rarely repeat their feats. When it comes to GDP, the best guide is the adage that prediction is difficult—especially about the future. ■

Charting the news

# What the world reads now

**The news events that most engrossed audiences in 2018**

IT IS CALLED the "beautiful game" for a reason. The 2018 men's football World Cup, hosted by Russia in June and July, kept the world riveted. According to Chartbeat, a company that tracks readership of online news articles, it was among the events that drew the most attention in 2018. Chartbeat's data cover some 5,000 publishers, half of which are in English-speaking countries, and about a quarter in Europe. The firm has provided audience figures for some 3m articles, spanning 33 topics.

What other news events engrossed the world in 2018? The royal wedding between Meghan Markle and Prince Harry drew the most eyes on a single day, with 1.1m hours spent reading articles as they tied the knot. Another heart-warming story, the rescue of young footballers from a cave in Thailand, got 3.4m hours of attention in total.

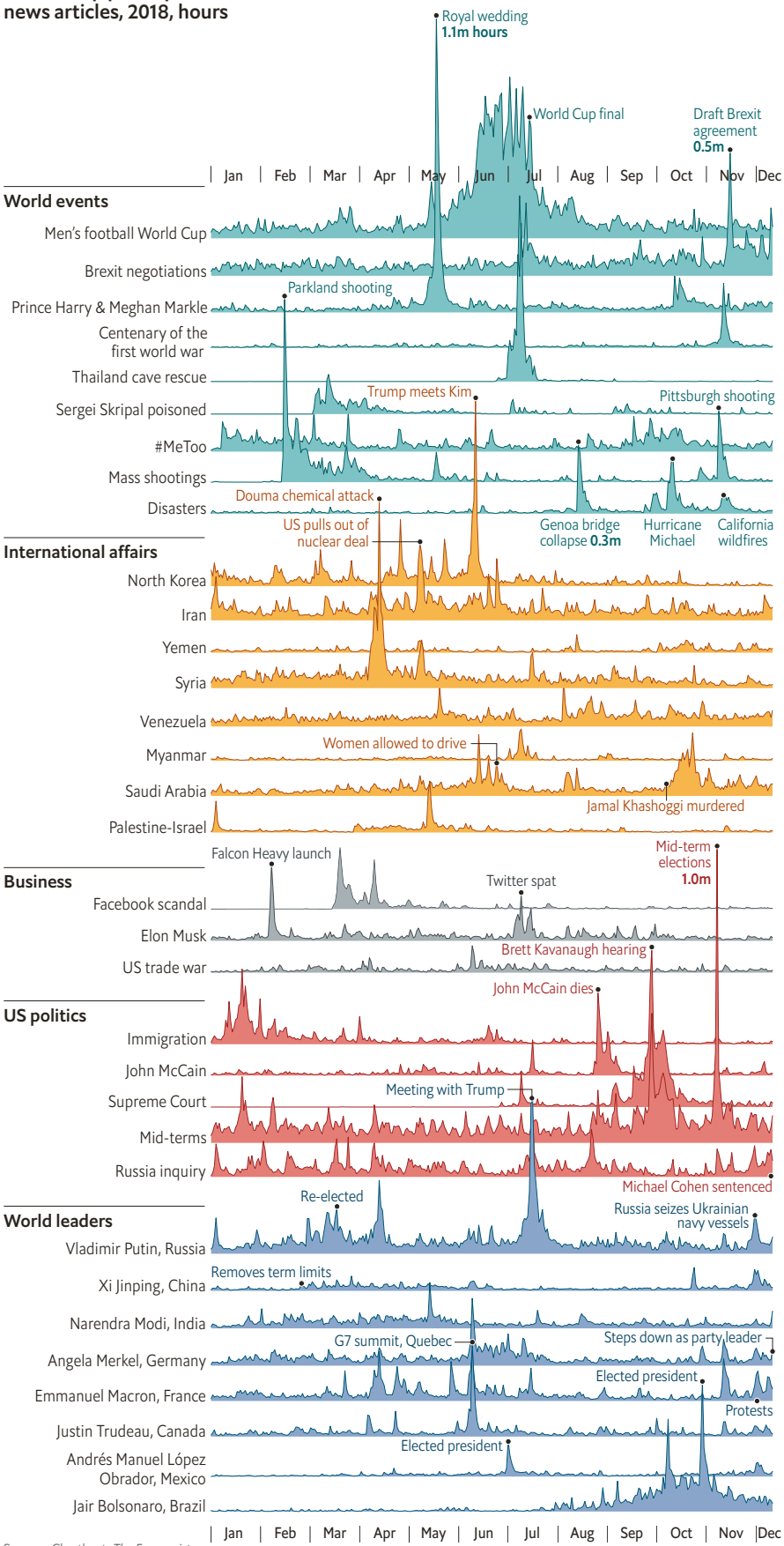
More often, however, big news was bad news. Sudden tragedies like the murder of Jamal Khashoggi, the mass shooting at a high school in Parkland, Florida, and the collapse of a bridge in Genoa in August received 12m hours between them. Longer-lasting woes in poor countries failed to drum up comparable interest: Yemen's civil war got just 3.5m hours for the entire year.

Business stories get less attention on the whole. But revelations that Facebook, the world's most popular social network, had allowed nefarious use of its data drew 3m hours of readership. Big personalities help to draw eyeballs: Elon Musk, the mercurial founder of Tesla and SpaceX, got 7m hours of attention in a year in which he was sued for securities fraud.

As in 2017, no one attracts eyeballs like President Donald Trump. His summit with North Korea's Kim Jong Un in June got 1.5m hours of readership. He would probably have preferred less attention to stories about Russian meddling during the 2016 presidential election, which have amassed 12m hours in 2018. Readers were particularly interested in his party's performance in the mid-term elections, which attracted 26m hours.

Mr Trump isn't the only world leader who fascinates readers. Brazil's election of Jair Bolsonaro, a populist in Mr Trump's mould, has collected 9.7m hours. And although Russia's president, Vladimir Putin, drew the most interest during the World Cup, his comfortable re-election and his navy's seizure of Ukrainian ships also kept audiences glued to their screens. ■

**Readership per day across relevant news articles, 2018, hours**

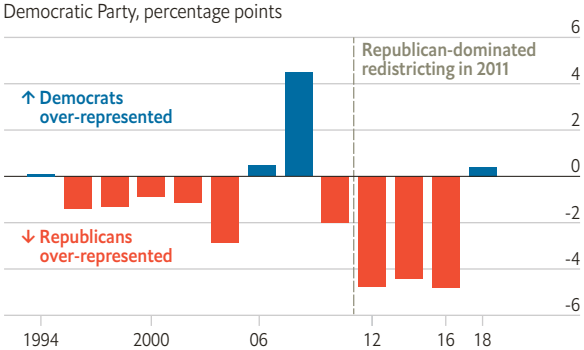



Sources: Chartbeat; *The Economist*

## The bias favouring Republicans in the House of Representatives vanished in 2018

Share of seats minus share of popular vote

Democratic Party, percentage points

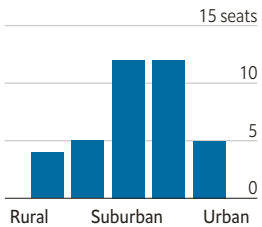



## Democratic gains among educated, suburban whites distributed the party's votes more efficiently

Democratic seat gains in 2018

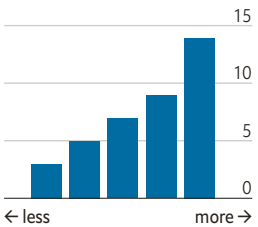
**By population density**

Population per square mile

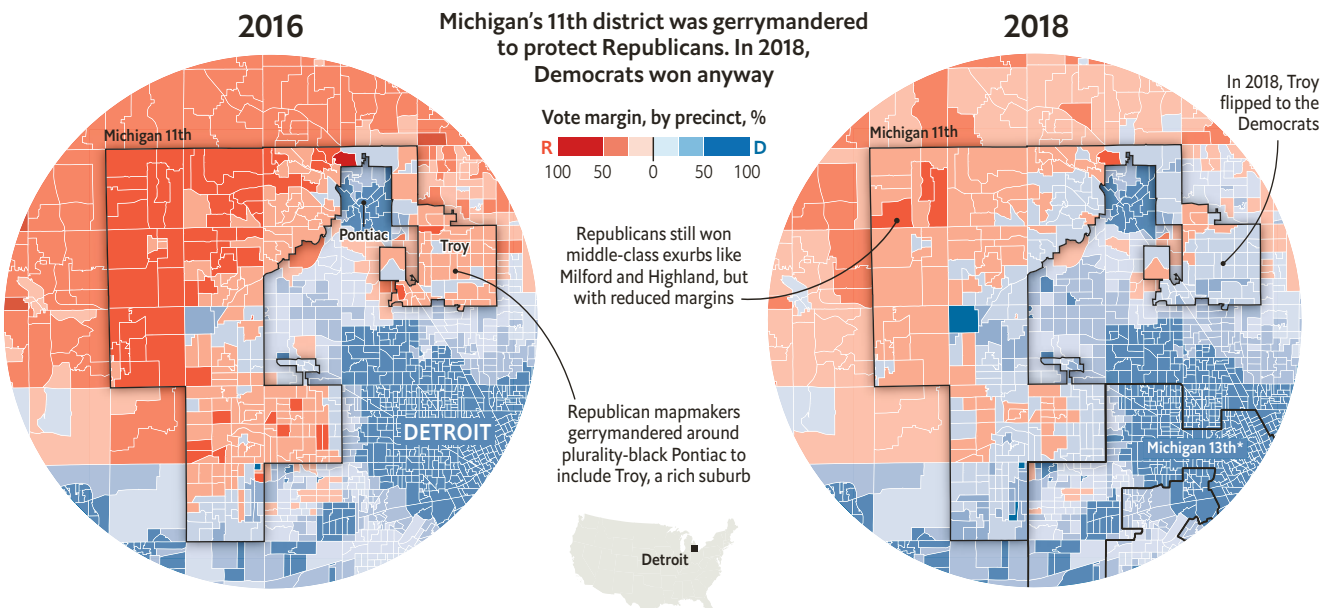



**By education gap among whites**

College minus non-college, % of whites aged 25+




## Michigan's 11th district was gerrymandered to protect Republicans. In 2018, Democrats won anyway




Sources: Michigan Department of State; Edison Research; Daily Kos

*In uncontested districts, including Michigan's 13th in 2018, we have imputed the most likely results

America's House of Representatives

# The failure of gerrymandering

### How educated, suburban whites ended the over-representation of Republicans

EVER SINCE district borders in America's House of Representatives were redrawn in 2011, Republicans' share of seats has exceeded their proportion of the vote. In 2012 Democrats won 51% of the two-party vote but just 46% of seats.

The Congress that began on January 3rd, however, has no such imbalance. Democrats won 54% of the total two-party vote—and also 54% of House seats. Whatever became of the vaunted pro-Republican bias?

America's political geography is shaped by education. In presidential contests the most influential voters are whites without college degrees, who cluster in "swing" states. By contrast, in House elections, white college graduates are unusually valuable, congregating in suburban districts where both parties are competitive.

Donald Trump has rearranged American politics, by courting working-class whites and alienating educated ones. That helped Republicans win the presidency. It should have hurt them in the House. But in 2016 the party got the best of both worlds, because many conservative whites with degrees split their tickets. In states whose presidential winner was never in doubt, they chose Hillary Clinton. But perhaps because they expected her to win and wanted a check on her power, they backed House Republicans in narrowly decided districts.

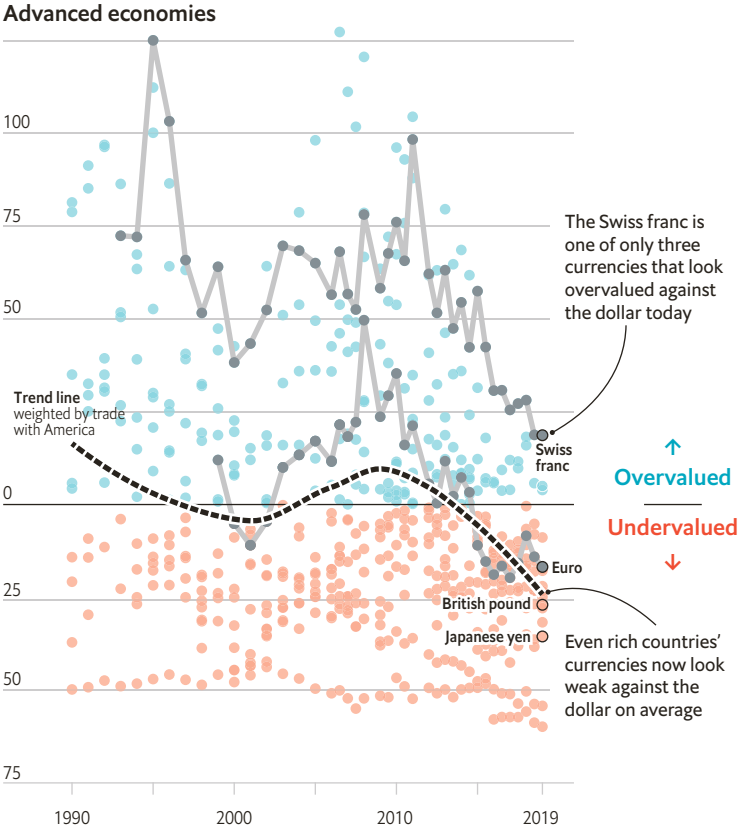
That changed in 2018, when educated whites abandoned Republican House candidates. Because Democrats were already competitive in suburbs, they needed only small swings. They won 13 of the 15 Republican-held districts where a majority of white voters have college degrees. That made the Democratic vote more efficient. In 2016 the party won 17 seats by single-digit margins; this time they took 40.

And what about gerrymandering, widely thought to protect incumbents? Republicans did draw the borders of more districts than Democrats did. But they only ran the process in 37% of seats. Of the 42 seats the party lost, it had gerrymandered just nine.

Those nine seats, however, show that extreme gerrymandering is risky. Many Republican mapmakers tried to neutralise Democratic voters by burying them in suburban districts full of educated whites. They never imagined that this ruse would backfire, but Mr Trump drove these once-loyal Republicans into Democrats' arms. ■

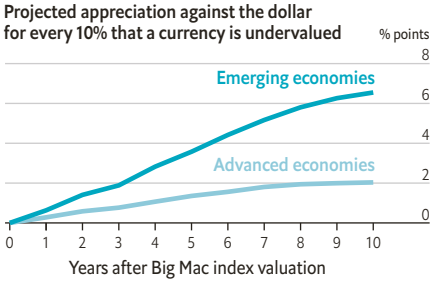
**The Big Mac index says the world's currencies are strikingly cheap against the dollar**

Currencies' over/undervaluation against the US dollar, %

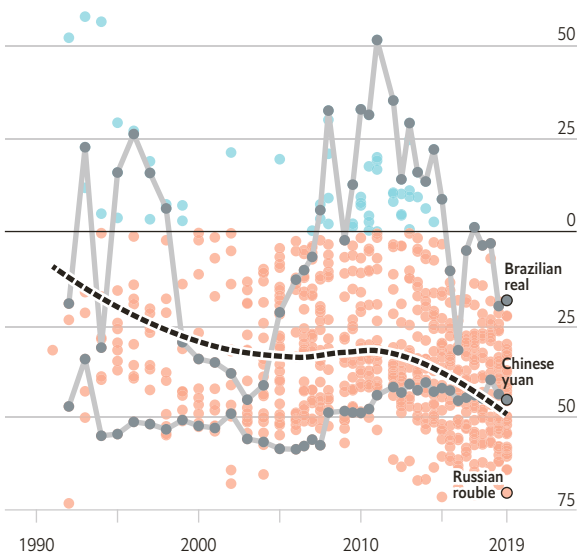



**Currencies deemed undervalued by the index tend to strengthen in the long term**

Projected appreciation against the dollar for every 10% that a currency is undervalued




Emerging economies




Sources: McDonald's; Thomson Reuters; *The Economist*

Burgernomics

# Pick of the menu

**Against the dollar, other currencies are at their cheapest in 30 years**

THE BIG MAC, the flagship burger of the McDonald's fast-food chain, is a model of consistency. Composed of seven ingredients, the double-decker sandwich is produced in nearly identical fashion across more than 36,000 restaurants in over 100 countries. This consistency is the secret sauce in the Big Mac index, *The Economist*'s lighthearted guide to exchange rates. According to our latest batch of data, almost every currency is undervalued against the dollar. The result is that the greenback itself looks stronger, relative to fundamentals, than at any point in three decades.

The Big Mac index is based on the theory of purchasing-power parity (PPP), which states that currencies should adjust until the price of an identical basket of goods—or in this case, a Big Mac—costs the same everywhere. By this metric most exchange rates are well off the mark. In Russia, for example, a Big Mac costs 110 roubles ($1.65), compared with $5.58 in America. That suggests the rouble is undervalued by 70% against the greenback. In Switzerland McDonald's customers have to fork out SFr6.50 ($6.62), which implies that the Swiss franc is overvalued by 19%.

According to the index most currencies are even more undervalued against the dollar than they were six months ago, when the greenback was already strong. In some places this has been driven by shifts in exchange rates. The dollar buys 35% more Argentinian pesos and 14% more Turkish liras than it did in July. In others changes in burger prices were mostly to blame. In Russia the local price of a Big Mac fell by 15%.

It is not unusual for emerging-market currencies to look weak in our index. But today the dollar towers over rich and poor alike. The pound, for example, looked reasonably priced five years ago. Today Americans visiting Britain will find that Big Macs are 27% cheaper than at home.

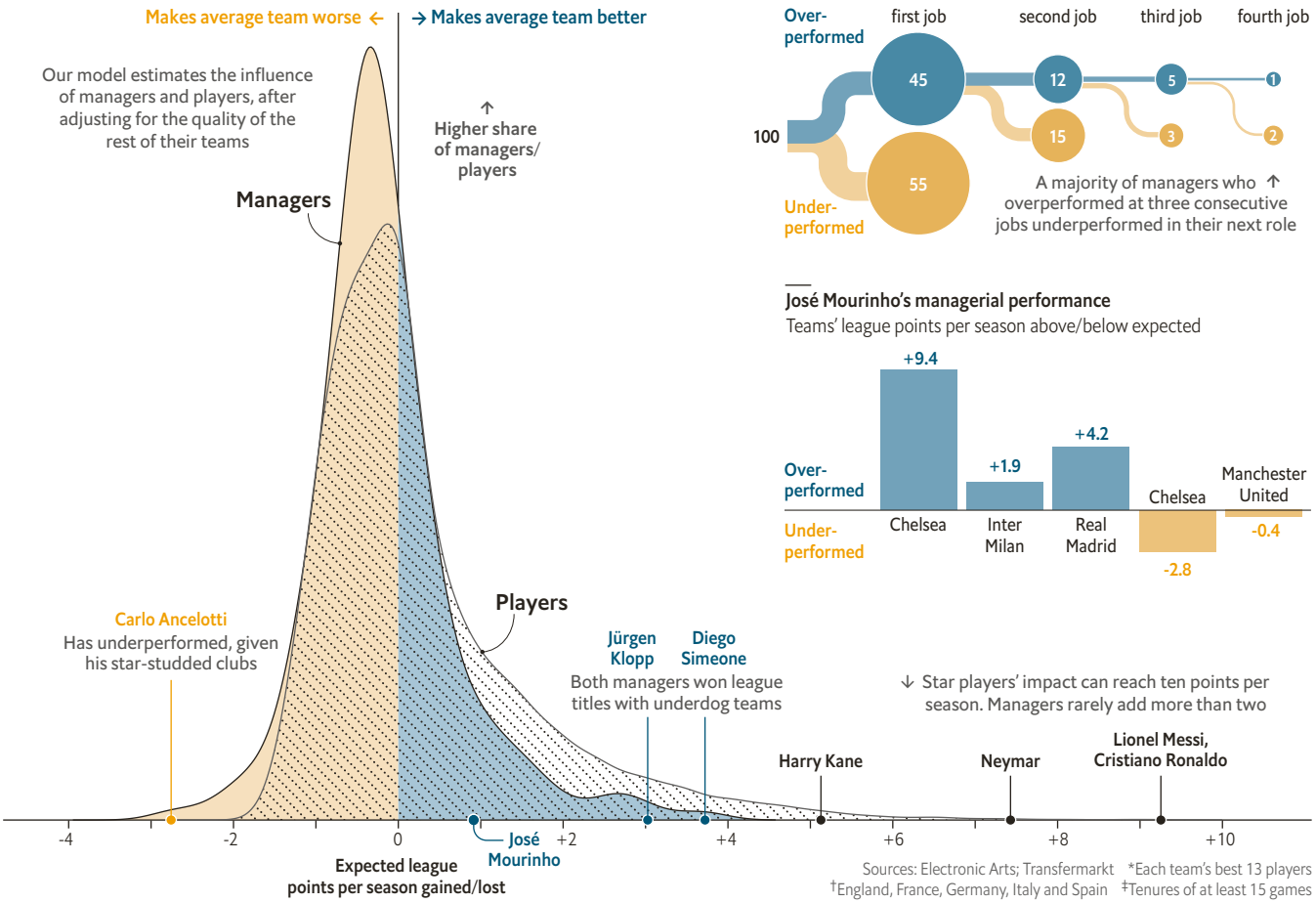
Such deviations from burger parity may persist in 2019. Exchange rates can depart from fundamentals owing to monetary policy or changes in investors' appetite for risk. In 2018 higher interest rates and tax cuts made American assets more attractive, boosting the greenback's value. That was bad news for emerging-market economies with dollar-denominated debts. Their currencies weakened as investors grew jittery. At the end of the year American yields began to fall as the global economy decelerated and investors anticipated a more doveish Federal Reserve. But the dollar has so far remained strong.

Although PPP is a poor predictor of exchange rates in the short-term, it stacks up better over long periods. An analysis of data going back to 1986 shows that currencies deemed undervalued by the Big Mac index tend to strengthen, on average, in the subsequent ten years (and vice versa). Something for investors to chew on. ■

To explore the full interactive version of the Big Mac index, visit **Economist.com/bigmac**

**Star football managers don't improve teams as much as star players do**

Distribution of managers and players* from "big five" leagues†, 2004-18




**Managerial overperformance is hard to sustain**

Over/underperformance in consecutive jobs

For every 100 managers‡, after adjusting for players' skill




José Mourinho's managerial performance

Teams' league points per season above/below expected




Sources: Electronic Arts; Transfermarkt *Each team's best 13 players †England, France, Germany, Italy and Spain ‡Tenures of at least 15 games

Managers in football

# Not so special

**For all the attention lavished on managers, their impact is modest**

"I THINK I am a special one," José Mourinho boasted in 2004. One of football's most lauded managers, he won six domestic titles in his first 11 seasons in top leagues. But his powers have deserted him of late. He was sacked by Chelsea in 2015, and by Manchester United last month.

Fans lay most of the credit or blame for their team's results on the manager. So do executives: nearly half of clubs in top leagues changed coach in 2018. Yet this faith appears misplaced. After analysing 15 years of league data, we found that an over-achieving manager's odds of sustaining that success in a new job are barely better than a coin flip. The likely cause of the "decline" of once-feted bosses like Mr Mourinho is not that they lost their touch, but that their early wins owed more to players and luck than to their own wizardry.

A manager's impact is hard to gauge. How should credit be split between the boss and his charges? To separate their effects, we needed a measure of players' skill. We found it in an unlikely place: video games. Electronic Arts' "FIFA" series rates 18,000 players each year, based on their statistics and subjective reports from 9,000 fans. These scores yield reliable match forecasts. Using only pre-season FIFA ratings, we could predict the final table with an average error of eight league points.

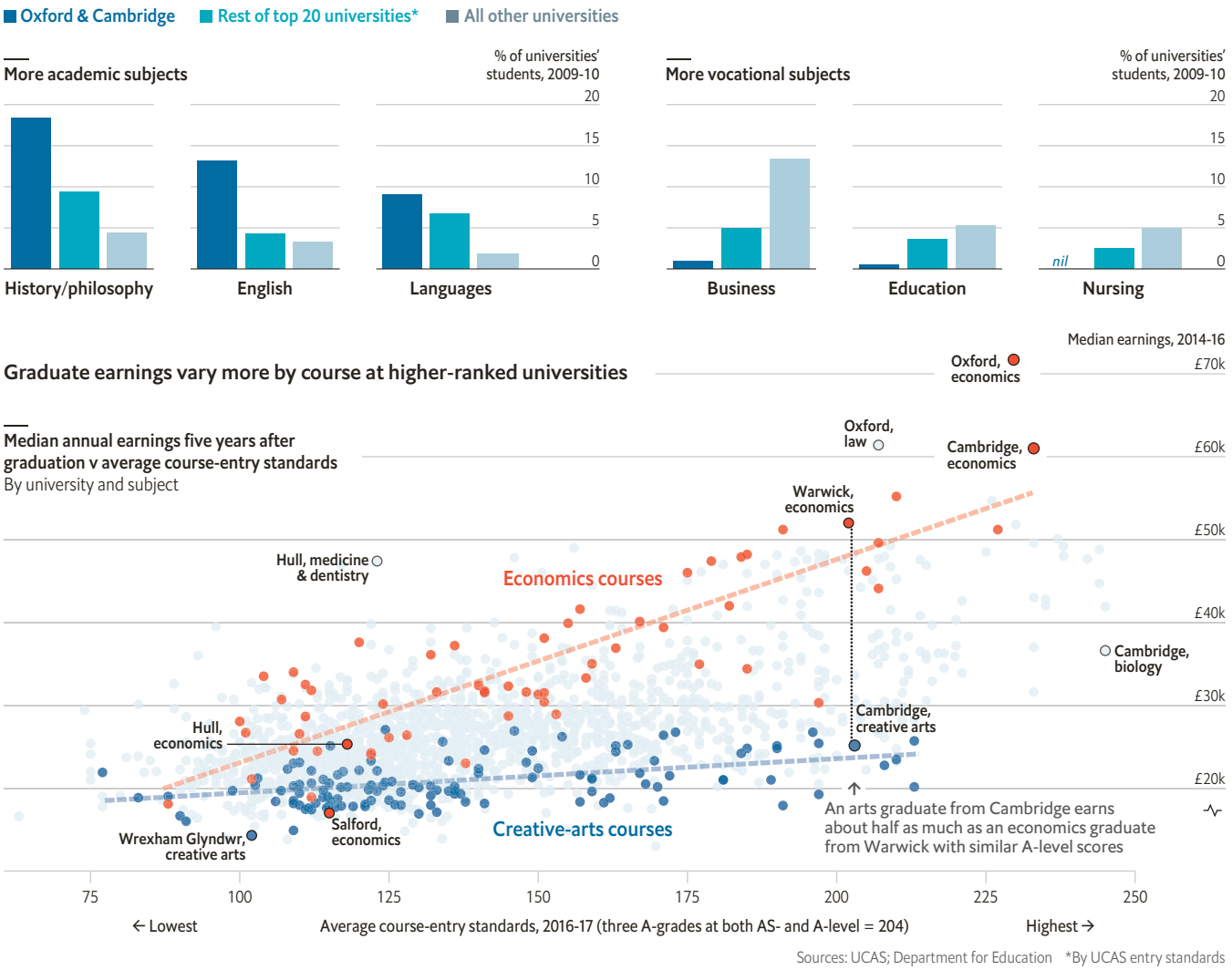
By comparing actual results with these projections, we could see which clubs did better than their players' ratings implied. Teams do over-perform for reasons other than their managers. But if coaching matters, the best bosses should continue to exceed expectations when they switch clubs.

Managers do carry over some impact. However, the effect is small. For a manager switching jobs after one year, we expect his new team to reap just 8% of his prior outperformance. Even after a decade of coaching, this figure is still only 45%, implying that the primary causes of a manager's previous successes were beyond his control.

A few bosses have beaten expectations for long enough to deserve proper credit. Despite lacking the star power of La Liga's titans, Diego Simeone led Atlético Madrid to a Spanish title. And Jürgen Klopp turned mid-table Borussia Dortmund into two-time German champions.

Conversely, Carlo Ancelotti has squandered resources. Although he has led the team with the best players in its league in eight of his past 12 seasons, he has won only three titles in that time. A top-league player who fared so poorly would have lost his job. But the market for coaches is inefficient. Mr Ancelotti keeps getting hired—perhaps because employers over-weight his three Champions League trophies, which required a much smaller number of wins.

Even the best tacticians cannot compete with those who contribute with their feet. Mr Simeone would improve an average club by four points, similar to the 50th-best player in the world. But greats like Lionel Messi can add twice as much or more. ■




Sources: UCAS; Department for Education *By UCAS entry standards

British universities

# Money and meaning

### Studying a "useless" field at Oxbridge costs a mint in forgone earnings

SCEPTICS OF HIGHER education often complain that universities offer too many frivolous degrees with little value in the workplace. Since elite universities tend to produce higher-earning graduates than less selective institutions do, you might expect them to teach more practical courses. Yet data from Britain's department for education show the opposite. Undergraduate students at prestigious universities are more likely to study purely academic fields such as philosophy and classics, whereas those at less choosy ones tend to pick vocational topics such as business or nursing.

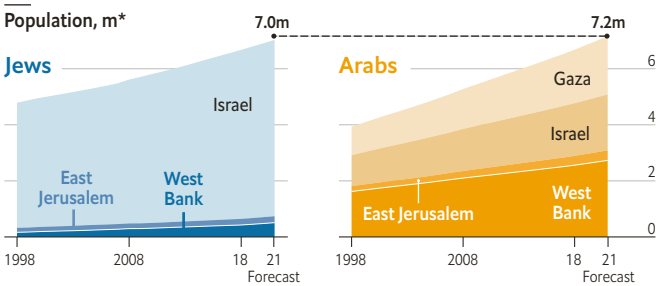
What could explain this seeming contradiction? One reason is that employers treat a degree from a top university as a proxy for intelligence. This means that students at elite institutions can study bookish subjects and still squeak by financially. The median Cambridge graduate in a creative-arts subject—the university's least lucrative group of courses, including fields such as music—earns around £25,000 ($32,400) at age 26. Economics students from less exalted universities, such as Hull, make a similar amount.

Yet even though Oxbridge students can pretend to read "Ulysses" for years and still expect a decent salary, they end up paying a large opportunity cost by pursuing the arts. That is because employers reserve the highest starting wages for students who both attended a leading university and also studied a marketable subject. Cambridge creative-arts graduates earn £11,000 more at age 26 than do those from Wrexham Glyndwr University, whose arts alumni are the lowest-earning in Britain. In contrast, Cambridge economics graduates make £44,000 more than do those from the University of Salford, where the economics course is the country's least remunerative.

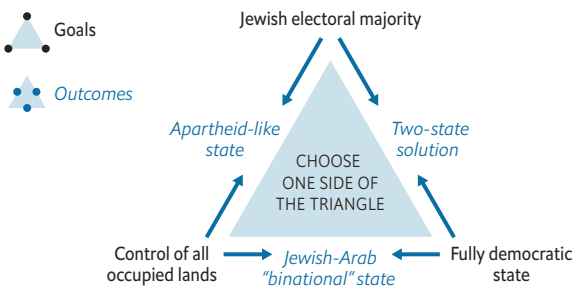
Many gifted arts students would struggle to crunch numbers. But for those who can excel at both, the cost of sticking with the arts, in terms of forgone wages, is steep. Cambridge creative-arts students have A-level scores close to those of economics students at Warwick, but earn about half as much. That is tantamount to giving up an annuity worth £500,000.

Who can afford such indulgence? The answer is Oxbridge students, who often have rich parents. At most universities, students in courses that lead to high-paying jobs, such as economics and medicine, tend to come from wealthier families, partly because such applicants are more likely to have the examination scores necessary to be accepted. At Oxbridge, however, no such correlation exists. History and philosophy students there come from richer parts of Britain, on average, than their peers studying medicine do. ■

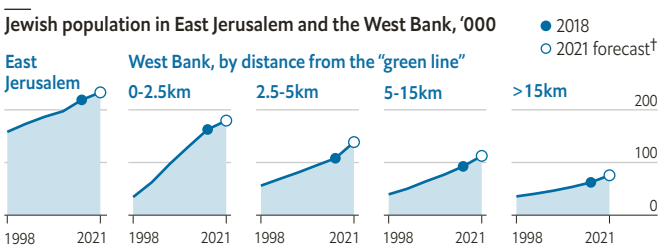
**Arabs may soon outnumber Jews in Israel and the occupied territories**

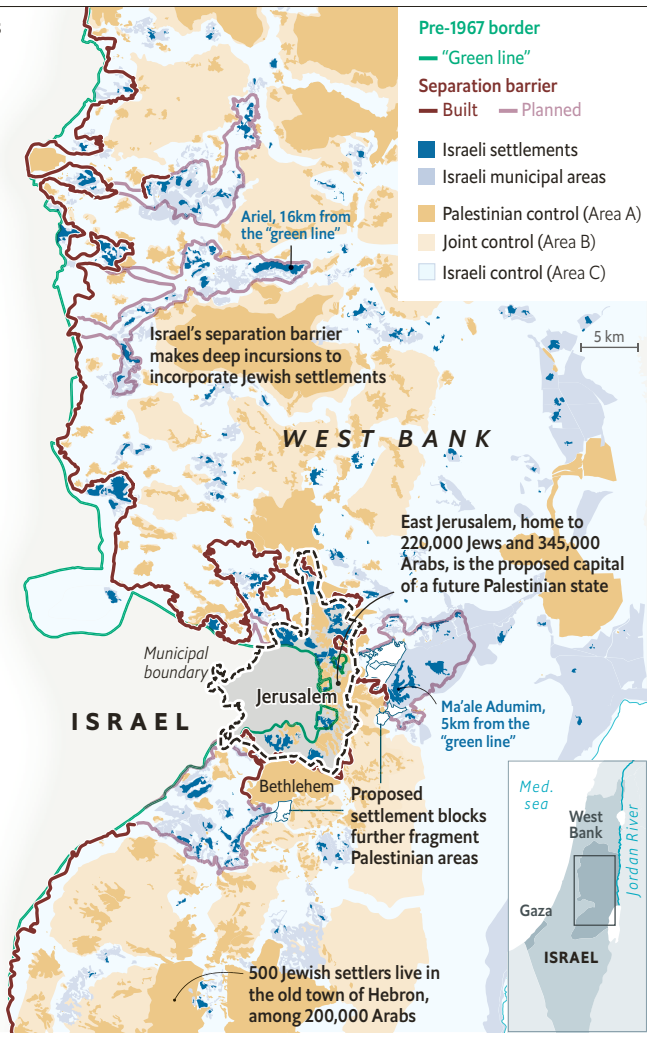



**That creates a "trilemma" for Israel, in which it must choose only two of three goals. Each pair results in a different outcome**




**A two-state solution may require settlers to be relocated, especially in communities far from the "green line"**




Sources: Israel CBS; Palestinian CBS; Jerusalem Institute for Policy Research; Peace Now; Washington Institute; *The Economist* (data available online) *Based on national statistics †Based on Peace Now data

Future of the Holy Land

# Facts on the ground

**By expanding settlements, Israel faces stark choices about its future**

ISRAELI-PALESTINIAN peace talks are frozen. President Donald Trump's plan for the "deal of the century" has been put off. The subject is absent in campaigning for the Israeli election in April, which focuses on looming corruption charges against Binyamin Netanyahu, the prime minister.

The Oslo accords of 1993 created a crazy quilt of autonomous zones in the lands that Israel captured in 1967. They also kindled the hope of creating a Palestinian state in most of the West Bank and Gaza Strip, with its capital in East Jerusalem. After much bloodshed, though, most Israelis are wary of this "two-state solution". Today Palestinians are mostly shut off by security barriers, and divided. The Palestinian Authority in the West Bank refuses to negotiate with Israel but co-operates on security. Its Islamist rival, Hamas, which runs Gaza, dares not risk another war, for now.

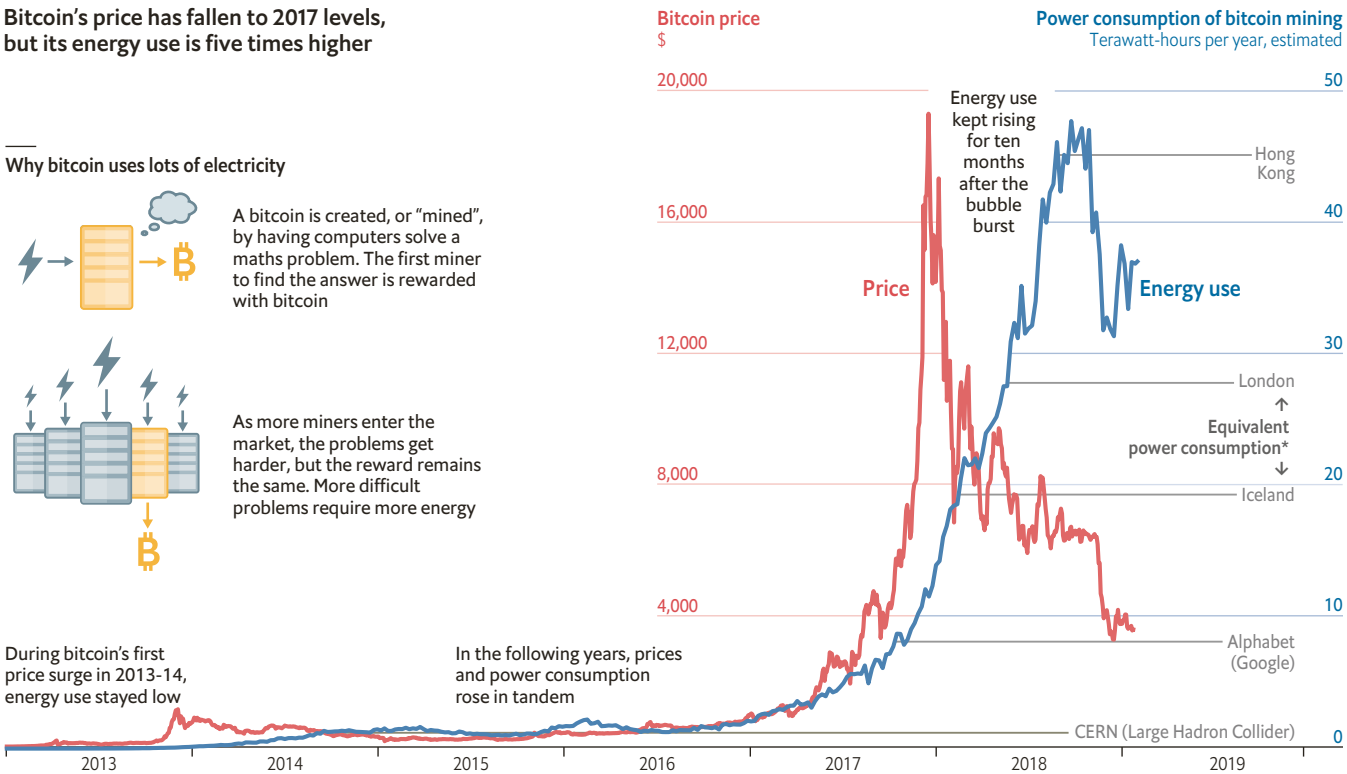
Besides, the growth of Jewish settlements makes a two-state deal ever harder. Establishing a Palestinian state would probably require the removal of settlers in its territory. Israel had trouble enough evicting 8,000 Jews from Gaza in 2005. There are more than fifty times as many in the West Bank. Even excluding East Jerusalem, annexed by Israel, the number of Jews east of the "green line" (the pre-1967 border) has risen from 110,000 in 1993 to 425,000. New home approvals nearly quadrupled from 5,000 in 2015-16 to 19,000 in 2017-18, according to Peace Now, a pressure group.

Such "facts on the ground" follow a pattern: more intense building in East Jerusalem and close to the green line; less so deeper in the West Bank. In theory, a line could be drawn to incorporate the vast majority of settlers within Israel. The route of the existing and planned barriers would take in 77% of the West Bank's settlers (or 85%, counting East Jerusalem). But this creates deep salients that break up Palestinian areas and cut them off from Jerusalem.

As Palestinians lose hope for a state of their own, some favour a "one-state" deal: a single state on all the land with equal rights for Jews and Arabs. Israel would have to give up its predominantly Jewish identity. That is because, between the Mediterranean and the Jordan river, the overall number of Arabs has caught up with that of Jews, and may soon exceed them.

This creates a "trilemma" for Israel. It cannot have at the same time a strong Jewish majority, all the land and a full democracy that does not discriminate against Arabs. In the end it must sacrifice either land in a two-state solution; or a Jewish majority in a big "binational" state; or the claim to being a proper democracy. It has tried to avoid such stark choices through messy partial withdrawals. But the more permanent its occupation becomes, the more it risks sliding towards apartheid. ■

**Bitcoin's price has fallen to 2017 levels, but its energy use is five times higher**




Bitcoin

# Mining their own business

**Will bitcoin's price crash cut into the currency's voracious energy use?**

When gold prices fall, precious-metals firms suspend exploration and close mines with high operating costs. In theory, bitcoin miners should act similarly. Although bitcoin is a virtual currency, it is expensive to obtain. To "mine" new bitcoins—ones that do not already belong to someone else—users hook up their computers to a network, and instruct them to keep guessing the solution to a maths problem until they get it right.

The difficulty of these tasks protects the integrity of the system: anyone seeking to rewrite bitcoin's transaction ledger would face the monumental burden of repeating them. However, such security is not cheap. Finding the answers requires lots of computing power, and thus lots of energy. At their peak in late 2018, bitcoin miners were thought to be using electricity at an annualised pace of at least 45 terawatt-hours per year, the average rate of all of Hong Kong.

As wasteful as it may seem, miners were rewarded handsomely for responding to a surge in demand for bitcoin. In 2017 the currency's price rose from $1,000 to nearly $20,000, yielding profits for speculators and miners alike. But in order to limit the supply of coins, the system adjusts the difficulty of the maths problems in response to computers entering or leaving its network. As more computing power becomes available, the solutions become harder to guess, raising the amount of electricity needed to mine each coin. Moreover, during the past year the bitcoin bubble has burst. Its price is now $3,400, down more than 80% from the peak.

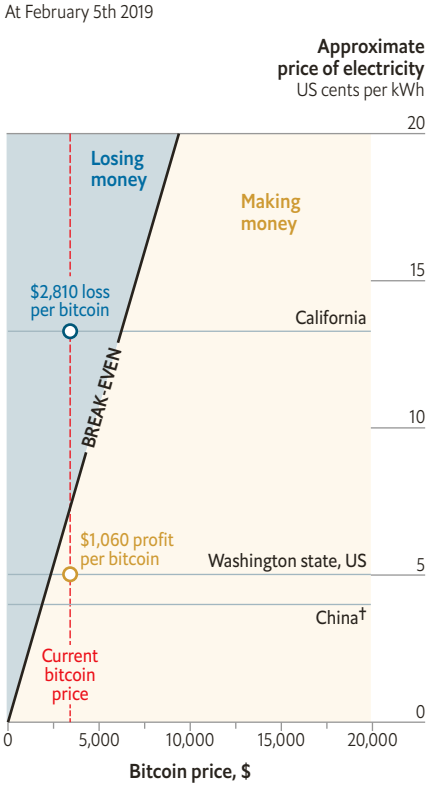
With higher costs and lower proceeds, miners should have stampeded out of the market. But in fact, relatively few have departed. Bitcoin's daily energy consumption today is still 16 times its level of two years ago, and just 30% below its record high.

At the current price and bitcoin network size, mining returns are sensitive to energy costs. Even within one country, industrial electricity prices can vary widely. In Washington state, a part of America rich in hydropower, each bitcoin fetches 45% more than the market price of the energy needed to mine it on an average day. But in nearby California, electricity costs 2.5 times more. Bitcoin would need to rebound to $6,200 to make full-time mining there profitable.

As the roller-coaster ride of bitcoin's price makes clear, the currency's value is impossible to predict. Miners have mostly weathered the crash so far. But a further decline of 50% or so would start forcing them out of business. The shake-out would only abate once the maths problems get easy enough that less power is needed, enabling the remaining miners to scrape by. ■

**Mining returns depend on the prices of bitcoin and energy**

At February 5th 2019




*2018 or latest available
†Price to bitcoin miners in Sichuan and Inner Mongolia

Sources: Alex de Vries; blockchain.com; EIA; press reports; national statistics

# Few "Hans" on deck

**New studies show migrants to America may have been highly individualistic**

"GIVE ME YOUR tired, your poor, your huddled masses yearning to breathe free," reads the poem on the Statue of Liberty. Censuses show that America's 19th-century immigrants were poor. No data exist on whether they also yearned for freedom. But new studies use a proxy for individualism—first names—to suggest that they did.

Academics can learn a lot about society from names. The persistence of privileged surnames in prized jobs reveals the slow pace of social mobility. And studies show that American firms tend to reject fake job applications that use typical black names.

In the 1800s Nordic countries tracked the names of the 25% of their population that moved to America. A recent paper by Anne Sofie Beck Knudsen of Lund University found that, among people of similar backgrounds, emigrants were less likely than people who stayed put to have one of their country's ten most common names.

That matters, since people with rare names tend to be individualists—perhaps because their parents want them to stand out. In one paper, students with unique names among their classmates had higher non-conformity scores (counted by things like "a desire to not always follow rules"). And countries with diverse names rank highly on the Hofstede individualism survey, which asks if people care more about personal success or their communities.

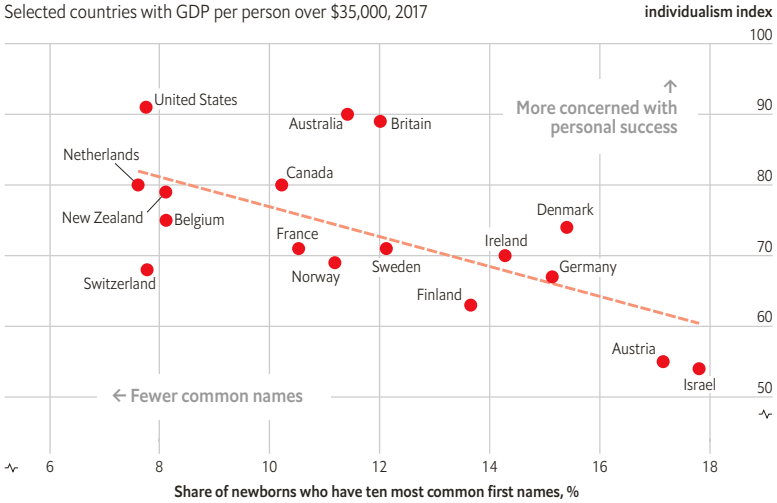
If Nordic emigrants were unusually individualistic, that may have affected politics. In the 1860s frosts ruined Swedish harvests. This set off emigration in areas near seaports. Mounir Karadja and Erik Prawitz, two economists, have found that unions and left-wing parties grew faster in these regions than in similar parts of Sweden (including port towns that avoided frosts).

The authors write that the option to emigrate emboldened workers to join unions, who backed leftist parties. But emigrants' rare names imply another possible explanation: an exodus of individualists left behind people friendly to collectivism.

American data bolster this story. Nordic immigrants with rare names were most likely to marry foreigners and learn English. Mesay Gebresilasse, Martin Fiszbein and Samuel Bazzi of Boston University find that the western frontier was full of people with rare names. Today, poll respondents in such places dislike taxes more than others in their state of the same sex, age and race do. The frontier spirit lives on. ■

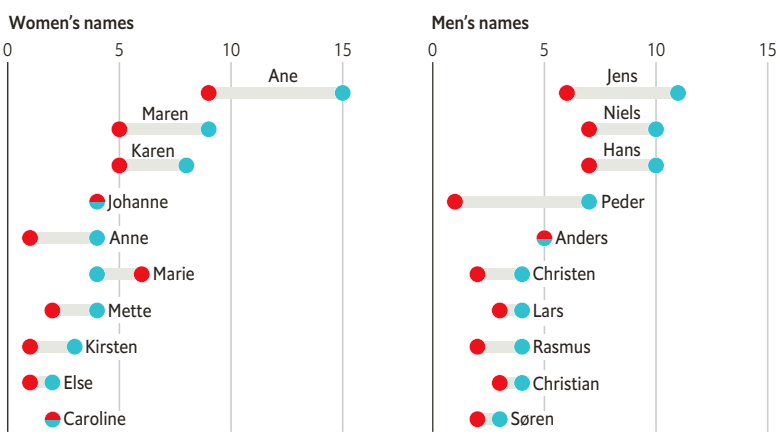
## → Rich countries with more unusual names are more individualistic

**Unusual names and individualism**
Selected countries with GDP per person over $35,000, 2017



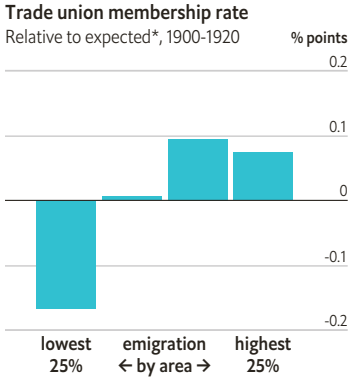

## → Few Scandinavian immigrants to America had common names

**Most common first names among Danish immigrants to America and Danish population**
As % of total, 1845

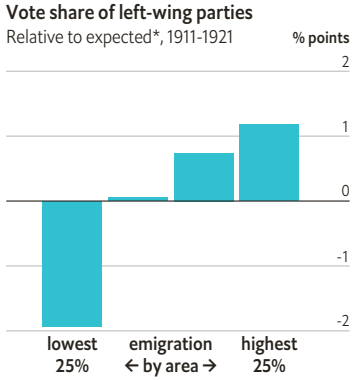



## → After emigrants left Sweden in the 1800s, the people remaining in high-emigration areas tended to embrace collectivist public policies

**Trade union membership rate**
Relative to expected*, 1900-1920

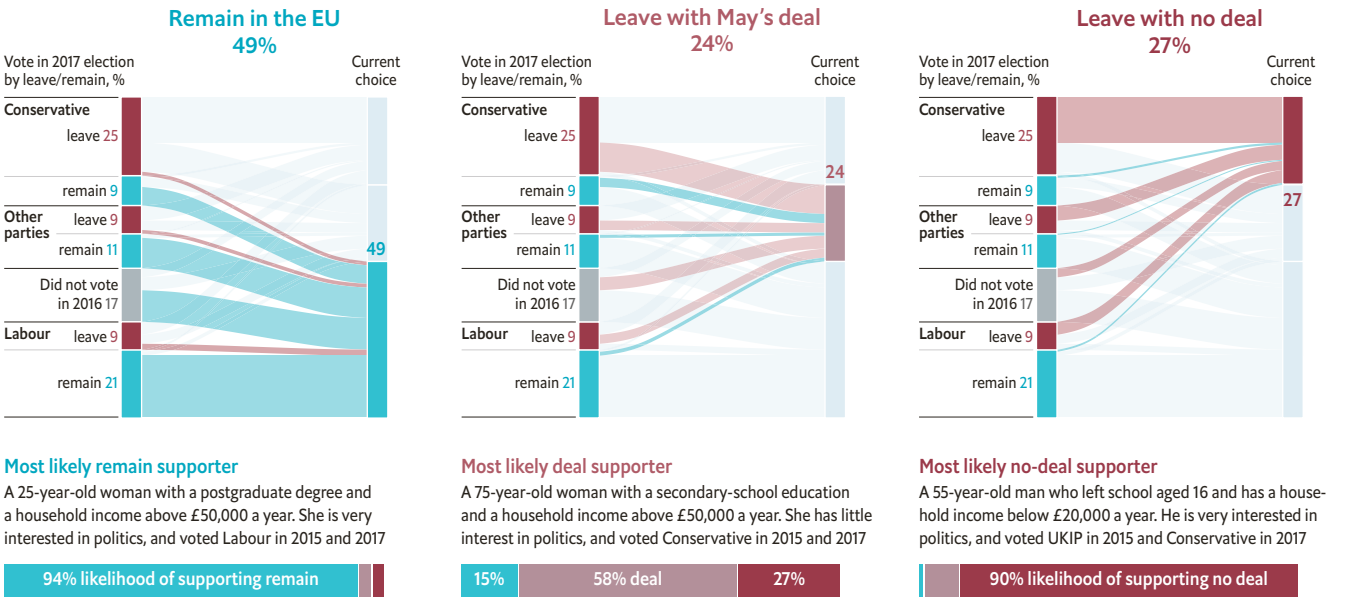



**Vote share of left-wing parties**
Relative to expected*, 1911-1921




*Based on population, geography and agricultural fertility Sources: "Those who stayed: individualism, self-selection and cultural change during the age of mass migration" by A.S.B. Knudsen, 2019; "Exit, voice and political change: evidence from Swedish mass migration to the United States" by M. Karadja and E. Prawitz, 2018

→ Views on Brexit have barely shifted since 2016, but leavers are split over Theresa May's deal




**Most likely remain supporter**

A 25-year-old woman with a postgraduate degree and a household income above £50,000 a year. She is very interested in politics, and voted Labour in 2015 and 2017

94% likelihood of supporting remain

**Most likely deal supporter**

A 75-year-old woman with a secondary-school education and a household income above £50,000 a year. She has little interest in politics, and voted Conservative in 2015 and 2017

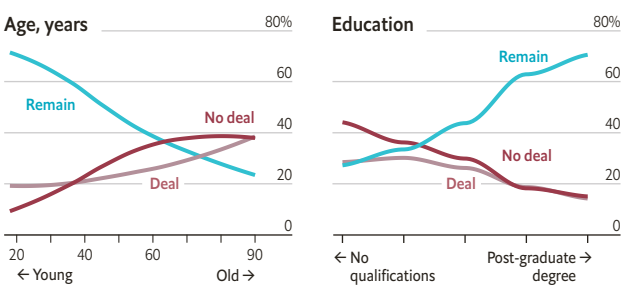
15% | 58% deal | 27%

**Most likely no-deal supporter**

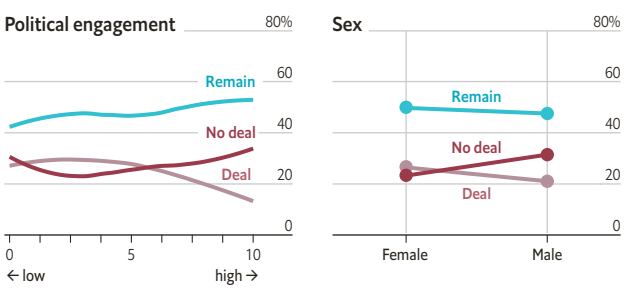
A 55-year-old man who left school aged 16 and has a household income below £20,000 a year. He is very interested in politics, and voted UKIP in 2015 and Conservative in 2017

90% likelihood of supporting no deal

→ Age and education strongly predict current views on remaining in the EU, but not on May's deal versus no deal




→ More politically engaged voters, particularly men, prefer remain or no deal to May's compromise




Sources: YouGov; *The Economist* Based on 90,000 British adults surveyed November 27th to December 9th 2018

# The centre cannot hold

### A polarised electorate has little desire for the government's compromise

AFTER 52% OF Britons voted to leave the EU in 2016, stunned observers wondered when and how Brexit would occur. The picture is scarcely clearer today. In January Parliament rejected the withdrawal pact agreed on with the EU by Theresa May, the prime minister. Yet a majority of MPS oppose leaving without a deal. And neither Mrs May nor Jeremy Corbyn, the opposition leader, backs a second referendum, which could undo Brexit altogether.

Eventually the public will have its say on the handling of Brexit, be it in a referendum or a general election. Voters are outraged. In a recent poll, 75% of respondents said that "politicians are not up to the job".

Yet voters are as split as Parliament is. Late last year YouGov, a pollster, asked 90,000 Britons if they preferred Mrs May's accord, leaving without a deal or staying in the EU. Just as in 2016, a narrow majority of those expressing an opinion wanted to depart. Few have changed their minds: 90% of leave voters and 84% of remainers would vote the same way today. However, leavers have split over Mrs May's plan, with 24% of respondents supporting it and 27% choosing no deal. Among leavers from her own party, 55% prefer no deal to her plan.

Using YouGov's data, *The Economist* has built a model of the odds of each respondent backing each Brexit option. The referendum divided Britons by age, income, schooling and party: old, poor Tories with little education chose to leave, while rich young Labourites with degrees wanted to remain. Based on these variables, the model reliably identifies both no-dealers and remainers. People with the most remain-friendly profiles were 94% likely to pick remain, and those with the most anti-EU traits were 90% likely to want no deal.

In contrast, fans of Mrs May's deal have less in common with each other. The highest chance the model gives to a respondent backing it is just 58%. That will make them harder to target in get-out-the-vote efforts.

Moreover, rather than sitting between no-dealers and remainers on age, income, schooling and party, deal supporters look like no-dealers, with two exceptions: interest in politics and Y chromosomes. Men who follow politics closely prefer the ideological end-points of leaving with no deal or remaining. Women, especially those who mostly ignore politics, are more open to the deal. Sadly for Mrs May, people bored by politics are also unlikely to vote.

Mrs May hoped her deal would be seen as a fair compromise between EU membership and a hard Brexit. In fact, the issue is so divisive that her plan is the least popular choice. The prime minister says she opposes a new referendum out of respect for the voters' verdict in 2016. Another possibility is that she fears what would happen if the people did vote on her plan. ■

# No longer a tastemaker

### The Academy's influence peaked half a century ago

"Green Book"? Critics sneered when Academy Award voters named this saccharine tale of a friendship between a black pianist and his white, tough-guy chauffeur the Best Picture of 2018. Yet rather than being a rare injustice, the award reinforced a trend. The top Oscar has increasingly gone to films that are soon forgotten.

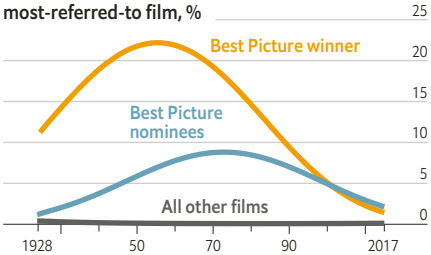
A film's quality is in the eye of the beholder. Its influence, however, can be measured more objectively. IMDb, a crowd-sourced online database, contains a list of references to every film in subsequent films and TV shows. For example, "Casablanca" has over 1,600 references, including a discussion in "When Harry Met Sally" and a poster in "True Romance".

The data are spotty: films from the 1980s get four times as many references as those from the 1940s. However, the same bias presumably applies to all films made in a given year. So a rough proxy for a movie's cultural influence is to count how many times it was referred to in subsequent years, and then compare its tally with those of all other films made in the same year.

Decades ago, Best Picture nominees were regularly among the most influential films. Fully 68% of references to films made in 1939 are to "Gone with the Wind" (a winner) and "The Wizard of Oz" (nominated). A statistical model shows that in the 1950s, Best Picture winners had a 20% chance of being the most-referred-to film.

That changed with the advent of "Star Wars", summer blockbusters and sequels. Since the 1970s the films most referred to have been commercial flicks. Oscar voters usually spurn such movies; the ones they do like have become commercially less successful, and thus less culturally relevant. Best Picture winners today have just a 2% chance of leading the references table. By snubbing "Black Panther" (which already has 151 references) and the art film "Roma", this year's voters scoffed at both cultural influence and critical acclaim. ■

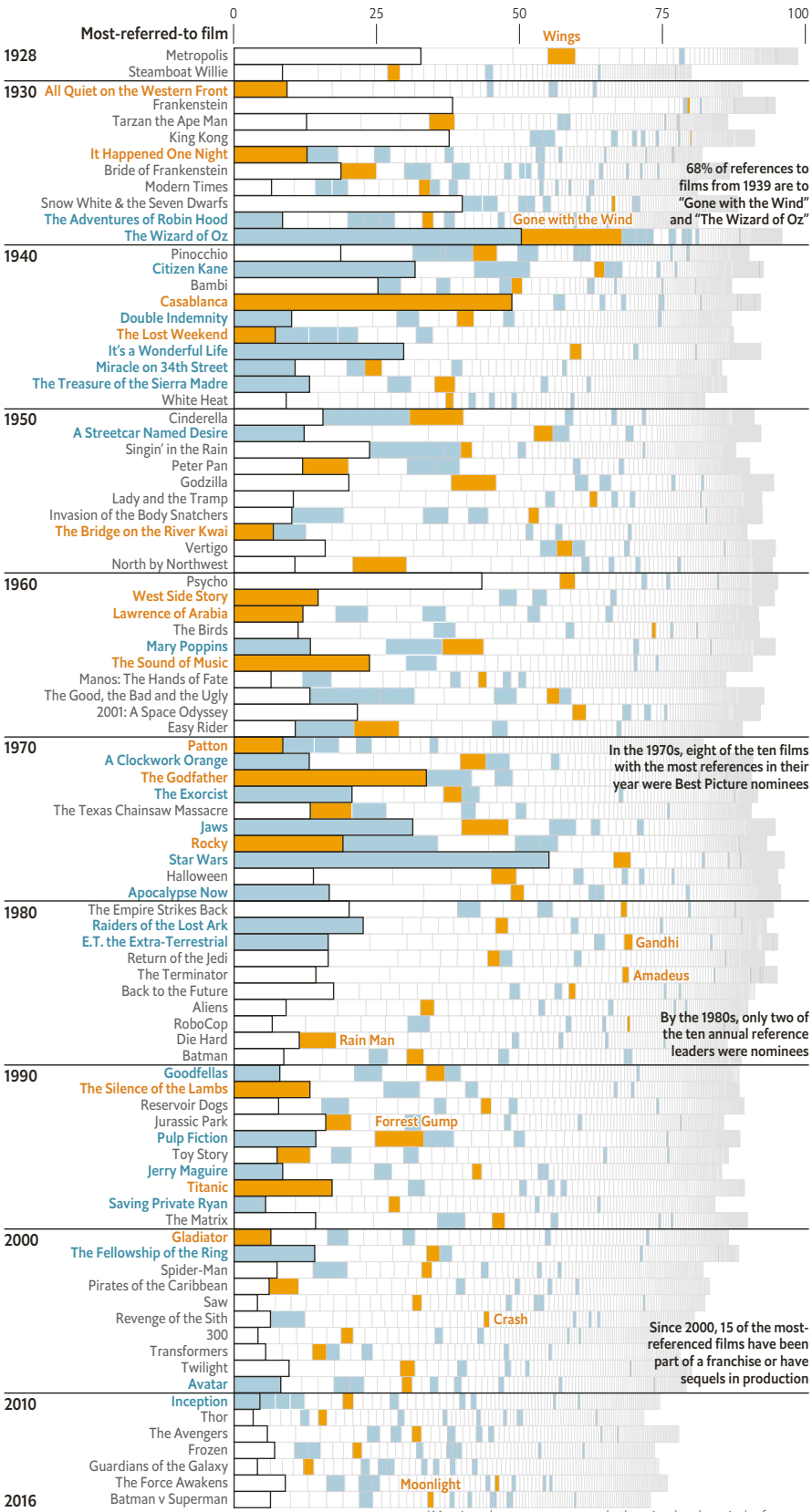
**Probability of being year's most-referred-to film, %**




## Best Picture winners have grown less memorable since the 1970s

Best Picture winners
Best Picture nominees
Other films

**Share of references* (in other films and TV shows) to films made in each year, %**
By Oscar-qualifying release date†, top 100 films per year




Source: IMDb, December 2017

*Mentions, homages, quotes and other visual and musical references
†Release dates span two years before 1934

# Fever pitch

### Measles outbreaks in America are getting harder to contain

In 2000 America declared measles "eliminated", meaning that the virus was no longer indigenous and any new infections were linked to strains brought in from abroad. In the following decade measles in America remained rare. Now cases are on the rise again. There were 372 in 2018, the second highest number since 1996. Over 200 were reported in the first two months of this year. Though the disease is rarely deadly, it often requires hospitalisation.

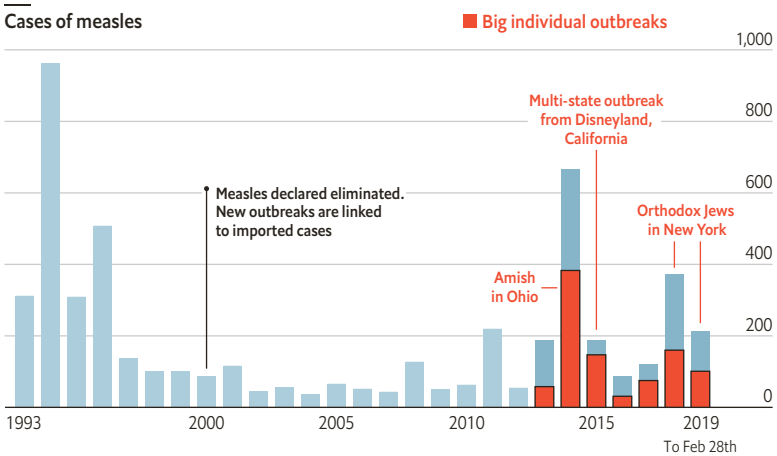
Most recent large outbreaks have been in insular religious or immigrant groups, such as the Amish, Orthodox Jews and Somali-Americans. Some had been lectured or leafleted by crackpots who claim that vaccines are harmful. They are easy prey for such conspiracy theories because language and cultural barriers keep them at a distance from mainstream health care. Low vaccination rates have made them hotspots for outbreaks, often ignited by measles picked up on visits to relatives in countries where the disease is widespread.

Imported cases have arrived from more than 75 countries, sparking outbreaks across America. Rapid action by public-health SWAT-like teams keeps the virus from spreading. The teams trace everyone who has been near the measles patient in the eight-day contagious period—and make sure that each contact is quarantined or immunised. Nine in ten people who are not immune would contract measles if exposed to it. The virus can linger in the air for hours.

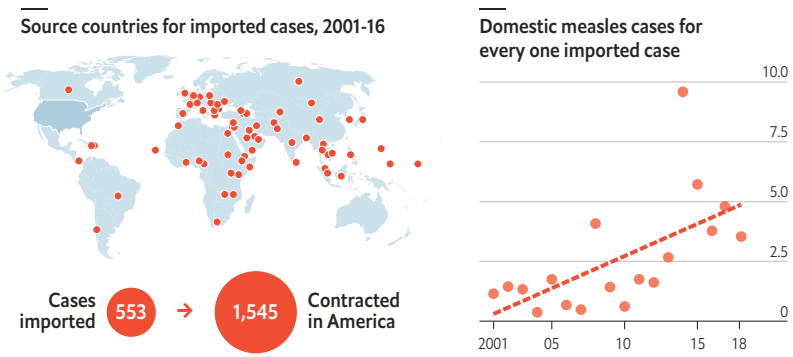
Containing outbreaks is becoming harder. The number of measles cases contracted in America for each imported case is increasing. A tally in 43 states in 2014-15 found that in nearly half of counties the rate of measles vaccination of children entering kindergarten was below the 95% needed to prevent an outbreak. Things may have got worse since. Almost all states allow parents to exempt their children from jabs by declaring a religious objection to vaccines; 17 states allow "philosophical" objections, too. In 2017-18 such non-medical exemptions were used for 2.2% of schoolchildren, double the rate in 2010-11.

As long as parents' choice is put before public health, stopping measles from spreading in America will be a laborious, costly task. Washington, one of the states battling an outbreak now, has spent more than $1m to curb contagion since an imported measles case arrived in January. ■

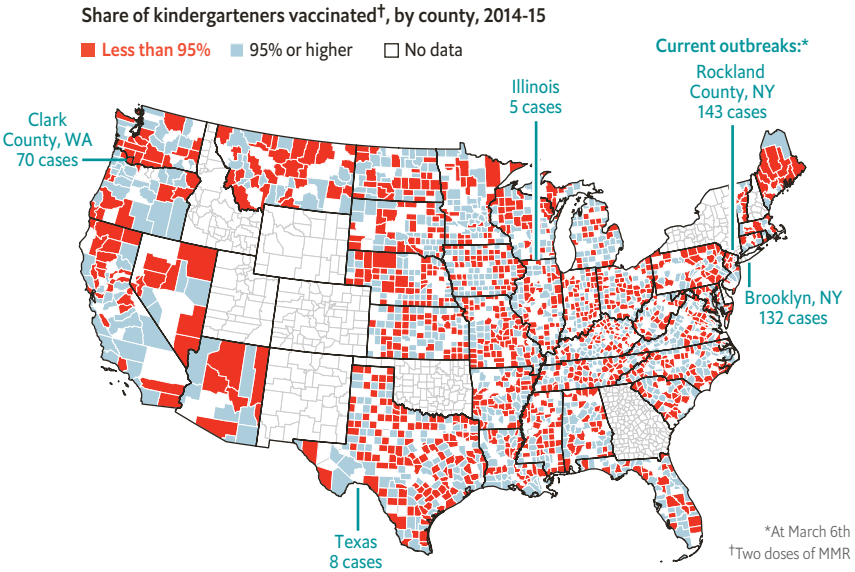
**→ Measles is on the rise in America. Most big outbreaks strike religious or immigrant communities**




**→ Measles has been imported to America from more than 75 countries. These cases are causing more domestic infections**




**→ Almost half of US counties have a vaccination rate lower than the level needed to prevent a measles outbreak**




Sources: CDC; "County-level assessment of United States kindergarten vaccination rates for MMR" by S.A. Kluberg et al. 2017; "International Importations of Measles Virus into the United States During the Postelimination Era" by Adrian Lee et al. 2018; *The Economist*

# Then and now

**A new paper on electoral geography unearths unsettling historical parallels**

Few countries have done more than Germany to repent of the sins of the past. Its post-war constitution banned Nazi symbols and anti-democratic parties. For decades the conservative Christian Democratic Union has guarded the right-wing frontier of German politics and kept extremists out of parliament.

Against this background, many Germans were alarmed when the far-right Alternative for Germany (AfD) won 13% of the vote in 2017, making it the third-biggest force in parliament. The party was founded to oppose EU bail-outs of debt-stricken countries like Greece, which many Germans saw as a transfer from industrious German taxpayers to feckless Greeks. In 2013 it fell short of the 5% of votes needed to enter parliament. The AfD was then transformed as nationalists took it over and began to rail against immigrants and Islam.

The AfD rejects the "extremist" label. People seen giving Nazi salutes have "nothing to do with our party", said Beatrix von Storch, its deputy leader. And it goes without saying that the AfD's agenda, though distasteful to liberals, is not remotely similar to that of the Third Reich.

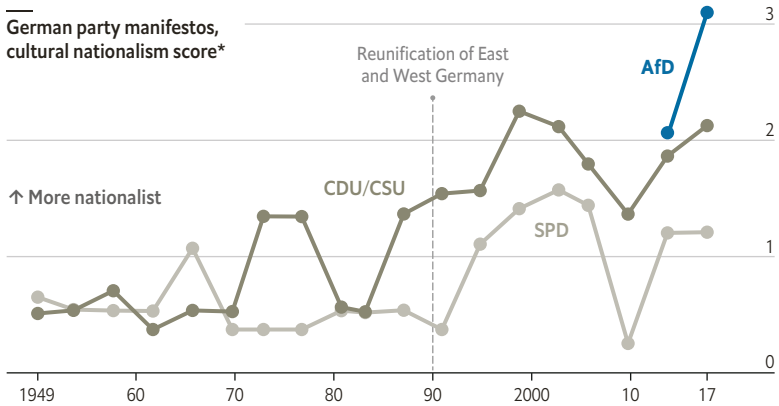
But a new paper finds an uncomfortable overlap between the parts of Germany that support the AfD and those that voted for the Nazis in 1933. At first glance, the link is invisible. The Nazis fared well in northern states like Schleswig-Holstein; the AfD did best in the former East Germany.

However, northern Germany has changed a lot. After the war, 12m ethnic Germans living in territory ceded to other countries fled to Germany. They flocked to northern states—by 1950 "expellees" made up 36% of Schleswig-Holstein—but mostly avoided the south-west. These transfers reshuffled Germany's political map.

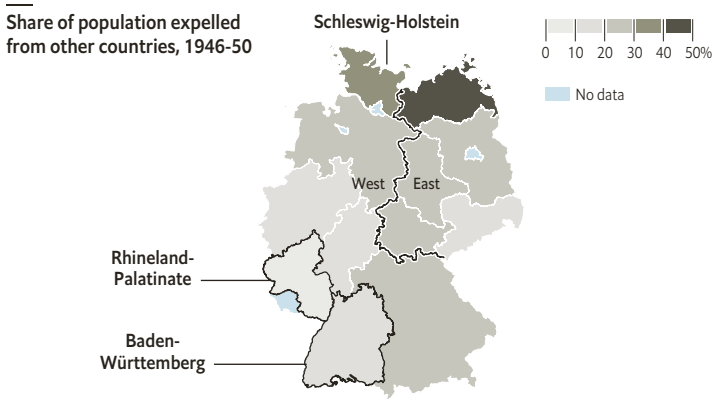
It is only in areas where pre-war demographics still persist that electoral maps show strong echoes of the past. Parts of the south-west that backed the Nazis in 1933 also embraced the AfD, and those that shunned Hitler rejected it. Overall, the paper's authors found that among municipalities with average far-right support but few expellees, a 1% increase in the Nazis' vote share in 1933 was associated with an extra 0.3-0.5% gain for the AfD from 2013-17.

These findings should be understood in a modern context. The Nazis are not coming back. But it seems that modern German nationalism has deep historic roots. ■

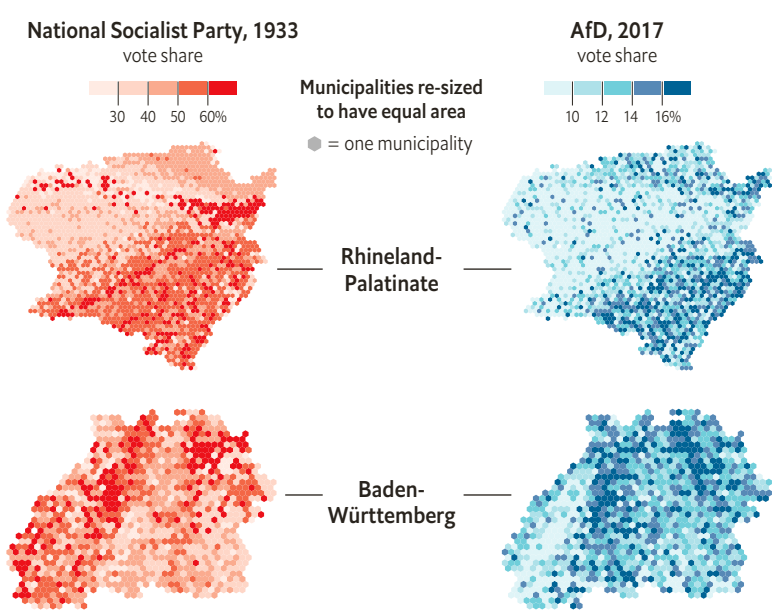
**→ The Alternative for Germany (AfD) is the most culturally nationalist party to enter parliament in post-war Germany**




**→ Post-war population transfers changed politics across Germany. But few migrants settled in the south-west, preserving pre-war demographics**




**→ Within the south-western states that received few migrants, AfD did best in municipalities that had voted for the Nazis**




Sources: "Persistence and Activation of Right-Wing Political Ideology", by D. Cantoni, F. Hagemeister, M. Westcott and E. Bogucka, 2019; Manifesto Project

*Harmonic mean of standardised Manifesto Project scores for supporting a "national way of life" and "traditional morality", and opposing "multiculturalism", re-scaled to positive numbers

**Self-reported happiness tends to be higher in richer countries, but does not always rise when economies grow**

Sources: *World Happiness Report*, by John Helliwell, Richard Layard & Jeffrey Sachs (eds), UN, 2019; World Bank

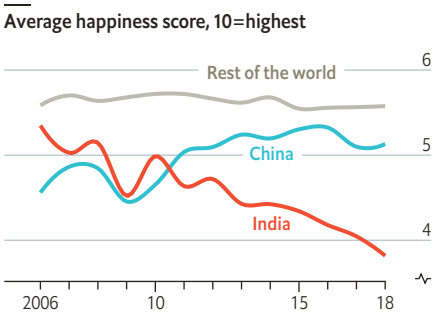
# Dismal science

### An old paradox about growth and happiness lives on

PHILOSOPHERS FROM Aristotle to the Beatles have argued that money does not buy happiness. But it seems to help. Since 2005 Gallup, a pollster, has asked a representative sample of adults from countries across the world to rate their life satisfaction on a scale from zero to ten. The headline result is clear: the richer the country, on average, the higher the level of self-reported happiness. The simple correlation suggests that doubling GDP per person lifts life satisfaction by about 0.7 points.

Yet the prediction that as a country gets richer its mood will improve has a dubious record. In 1974 Richard Easterlin, an economist, discovered that average life satisfaction in America had stagnated between 1946 and 1970 even as GDP per person had grown by 65% over the same period. He went on to find a similar disconnect in other places, too. Although income is correlated with happiness when looking across countries—and although economic downturns are reliable sources of temporary misery—long-term GDP growth does not seem to be enough to turn the average frown upside-down.

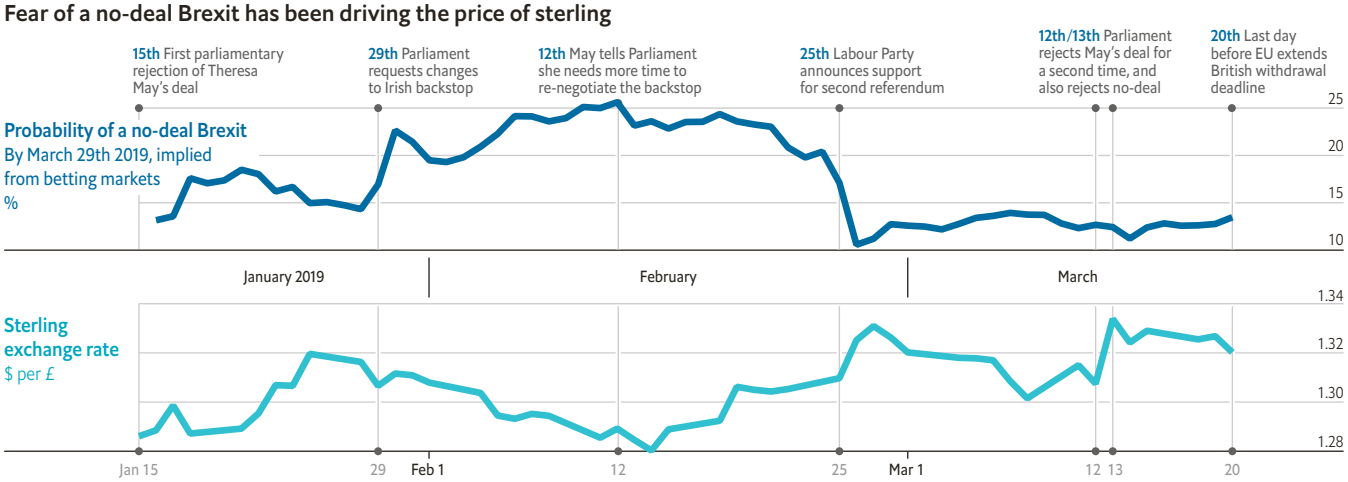
The "Easterlin paradox" has been hotly disputed since, with some economists claiming to find a link between growth and rising happiness by using better quality data. On March 20th the latest Gallup data were presented in the *World Happiness Report*, an annual UN-backed study. The new data provide some ammunition for both sides of the debate but, on the whole, suggest that the paradox is alive and well.



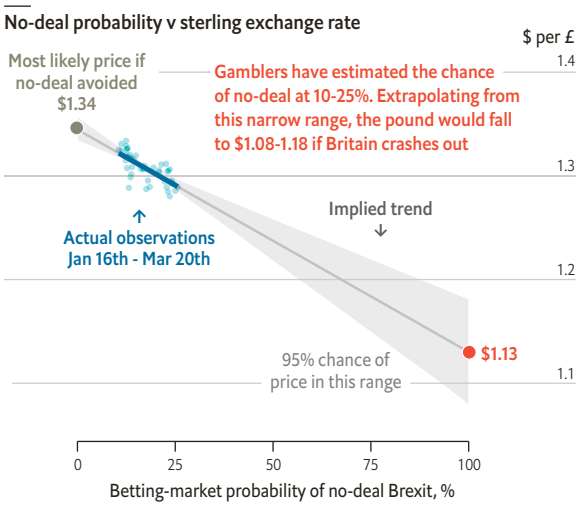

There are important examples of national income and happiness rising and falling together. The most significant—in terms of population—is China, where GDP per person has doubled over a decade, while average happiness has risen by 0.43 points. Among rich countries Germany enjoys higher incomes and greater cheer than ten years ago. Venezuela, once the fifth-happiest country in the world, has become miserable as its economy has collapsed. Looking across countries, growth is correlated with rising happiness.

Yet that correlation is very weak. Of the 125 countries for which good data exist, 43 have seen GDP per person and happiness move in opposite directions. Like China, India is a populous developing economy that is growing quickly. But happiness is down by about 1.2 points in the past decade. America, the subject of Easterlin's initial study, has again seen happiness fall as the economy has grown. In total the world's population looks roughly equally divided between places where happiness and incomes have moved in the same direction over the past ten years, and places where they have diverged. ■

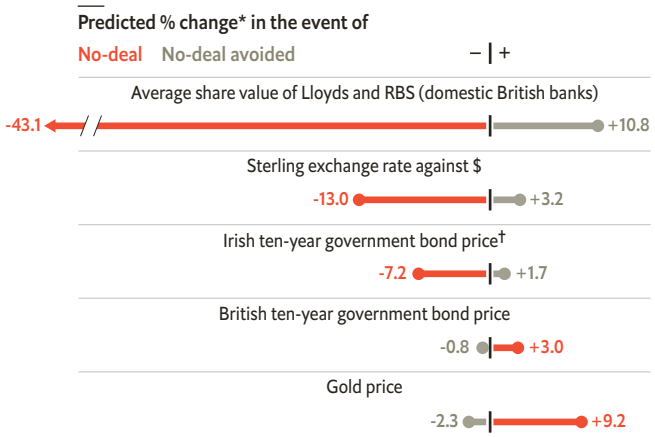
### Fear of a no-deal Brexit has been driving the price of sterling




### No-deal would probably cut the pound's value by around 15%...




### ...and trigger a flight to safety, boosting gold and gilts




*Based on extrapolating betting odds from current no-deal probability of 20% to 100% or 0%
†Assuming no change in German sovereign bond yields Sources: Betfair Exchange; Bloomberg

# The price of no-deal

**Crashing out would probably send sterling to its lowest level since 1985**

REGARDLESS OF WHAT they tell you, traders struggle to explain short-term fluctuations in the value of currencies. Recently, however, the pound has become an exception. Every time it seems more likely that Britain will leave the EU without a deal, sterling falls against the dollar.

The strength of this link can be measured statistically, thanks to a helpful proxy for the odds of no-deal. On January 16th a market opened on Betfair Exchange, a betting website, on whether Britain will crash out by March 29th, the original Brexit deadline. Punters have bet £3.9m ($5.1m).

On March 21st the EU extended this deadline, causing the chances of no-deal by the end of March to fall to near zero. But for the 64 days between the opening of the market and the granting of the extension, the odds seemed to mirror the exchange rate. For each ten-percentage-point rise in the probability of no-deal, the pound lost $0.02, and vice versa. As sterling moved between $1.28 and $1.33, it was possible to predict the exchange rate from Betfair's odds with an average error of just one cent.

This correlation is robust enough to allow for educated guesses about where the pound might land if Britain crashes out. If the same relationship were to hold, there would be a 95% chance sterling would fall from its current price of $1.32 to between $1.08 (last reached in 1985) and $1.18. The most likely value would be $1.13.

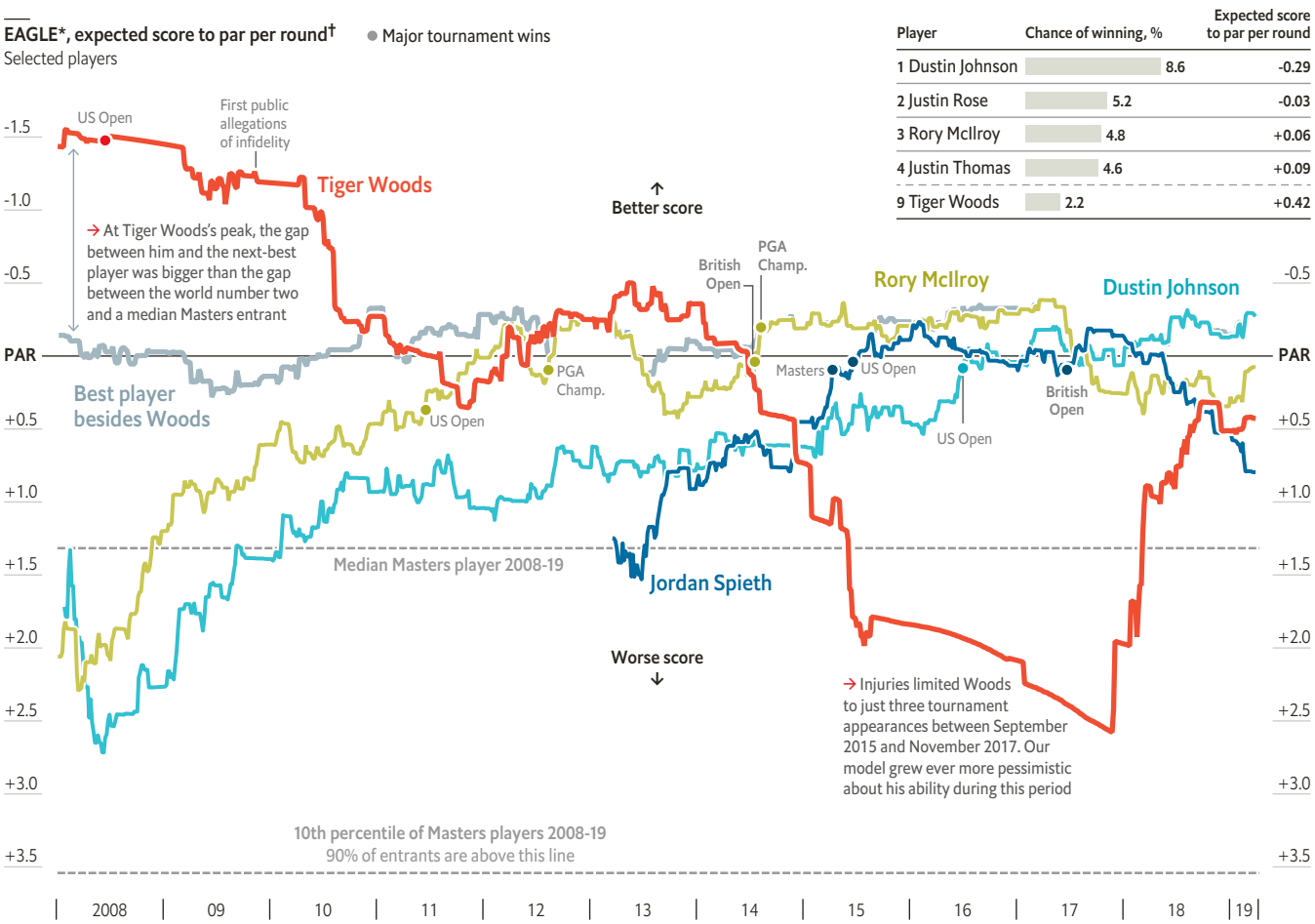
The same method can be applied to other markets with strong links to no-deal odds. Among the assets we tested, the biggest winner from no-deal would be gold, with an expected gain of 9%. The worst losers would be domestic British banks, which are heavily exposed to the housing market. For each rise of ten percentage points in Betfair's no-deal price, the average share price of Lloyds and RBS has fallen by 5.4% of their current value. This implies that no-deal would cut them nearly in half.

Surprisingly, the method finds that no-deal would set British and Irish bonds on opposite paths. A crash-out would hit Ireland's debt hard, causing the gap between its interest rate and Germany's to rise from 0.6 percentage points to 1.4. In contrast, British yields would fall from 1.0% to 0.6%.

One cause of this divergence is that Britain, unlike Ireland, sets its own monetary policy. Facing an adverse shock, the Bank of England can cut interest rates and use quantitative easing, boosting bond prices. The European Central Bank, however, sets policy for the entire euro zone, not just for countries such as Ireland that would be particularly badly harmed by no-deal.

Our figures are uncertain. Correlations that look robust within a small range of no-deal prices could fail outside it. But unless no-deal becomes more likely, forecasts of its impact require tenuous assumptions. As George Box, a statistician, said, all models are wrong, but some are useful. ■

**Modern greats pale in comparison with peak Tiger. So does modern Tiger**




**EAGLE predictions for the 2019 Masters Tournament**

| Player | Chance of winning, % | Expected score to par per round |
|---|---|---|
| 1 Dustin Johnson | 8.6 | -0.29 |
| 2 Justin Rose | 5.2 | -0.03 |
| 3 Rory McIlroy | 4.8 | +0.06 |
| 4 Justin Thomas | 4.6 | +0.09 |
| 9 Tiger Woods | 2.2 | +0.42 |

*Economist* Advantage in Golf Likelihood Estimator †On course of average difficulty for a major, translated to 2019 scoring environment. Par is the score that course organisers expect from an "expert" player on each hole Source: *The Economist*

# The once and future king?

***The Economist*'s Masters forecast is lukewarm about golf's biggest star**

TIGER WOODS is back—sort of. He had won 14 major titles by the age of 32, and seemed destined to break Jack Nicklaus's all-time record of 18. Since 2009, however, Mr Woods has not been himself, thanks to injuries and the mental turmoil that began when his marriage fell apart. After playing in just three events during the two years to November 2017, his career seemed over.

Recently, however, Tiger has burned bright once again. He was among the top finishers in the past two majors, and in September won his first event since 2013. The Masters, the first of the four annual major tournaments, begins on April 11th. Is the 43-year-old really a credible contender?

The best-known measure of golfers' ability is the Official World Golf Rankings (OWGR). Players earn OWGR points based on their order of finishing in each event and the previous rankings of other golfers taking part. However, the OWGR make no use of individual scores once play begins. As a result, a golfer who performs brilliantly—but loses to a rival who plays even better—gets fewer points than one who ekes out a win because everyone else had a bad day.

Is this the best way to evaluate skill? We think not. EAGLE (*Economist* Advantage in Golf Likelihood Estimator), our prediction model for men's major golf tournaments, ignores competitors' results and relies on players' personal scoring records, adjusted for course conditions and difficulty. Starting with the Masters, we will launch an online visualisation showing EAGLE's forecasts of every golfer's chances of victory and odds of each possible score on each hole. It will update every two minutes.

Our algorithm is impressed by Mr Woods's comeback. At his worst point, EAGLE predicted him to shoot an average of 2.6 strokes above par per round on a typical major course—worse than 85% of golfers in the Masters. It now puts him at 0.4 shots above par, among the world's ten best.

However, Mr Woods's renaissance still leaves him 0.7 strokes per round behind Dustin Johnson, the best current player. That gap is large enough for EAGLE to give Mr Johnson a 9% chance to win the Masters, compared with just 2% for Mr Woods.

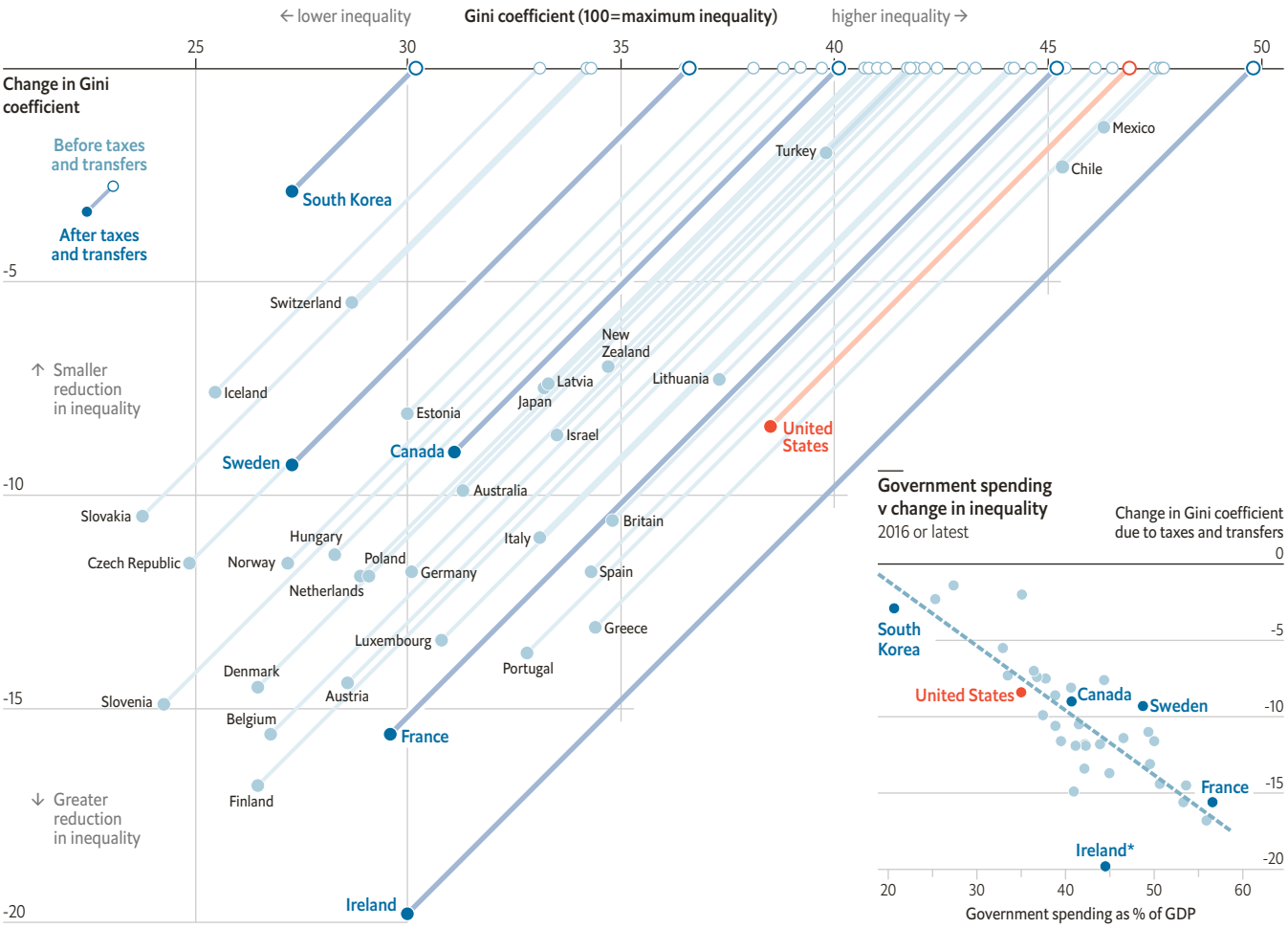
And even Mr Johnson cannot compare to Mr Woods at his best. If the Mr Woods of 2008, when he last won a major, were transported to 2019, EAGLE finds he would shoot 1.5 strokes below par per round. The gap between "peak Tiger" and Phil Mickelson, then the second-best player, was bigger than the one between Mr Mickelson and a median Masters entrant. Such dominance gave Mr Woods a 25% chance of winning each major he entered in that era.

Betting markets put Mr Woods's odds of donning the Masters victor's green jacket at 5%, more than twice EAGLE's estimate. He has made many a pauper of punters who bet against him. But it is more likely than not that he has let loose his last roar. ■

You can follow our Masters predictions live at **Economist.com/eagle**

**Which countries' tax systems do the most to offset income inequality?**

**Effect of taxes and transfers on income Gini coefficient**
OECD countries, 2016 or latest




**Government spending v change in inequality**
2016 or latest




*Tax revenue as % of modified GNI Sources: IMF; OECD; Central Statistics Office Ireland

# Net benefits

**America's high inequality reflects gross incomes as much as its tax system**

When people think about which rich countries have the least equal income distributions, America often jumps to mind. The country has a much smaller welfare state than many of its European counterparts, which suggests it does not redistribute much. But does it?

One common measure of income inequality is the Gini coefficient. The index ranges from zero to 100. A score of zero implies that income is shared equally; 100 implies that one person scoops the lot. By comparing a country's Gini coefficient before and after taxes and transfers, a rough gauge can be created of how progressive (or regressive) its tax and benefit system is.

By this measure at least, America's tax system is in fact fairly progressive. It does roughly as much to reduce inequality as does Canada's or Sweden's (even though most European systems do more). What distinguishes America from those two countries is that its pre-tax Gini coefficient is high, so that the government has to put in more work to level the playing field. In contrast, countries with low pre-tax inequality, such as South Korea, manage to achieve low post-tax inequality without doing much by way of redistribution.

The difference in countries' Gini coefficients after taxes and transfers correlates strongly with the economic weight of government. In France government spending accounts for 57% of GDP. America's federal, state and local authorities spend just 35%. Although pre-tax inequality is almost as high in France as in America, the two countries look very different after taxes.

Nordic countries are generally thought to be champion redistributors. But within the OECD, a club of mostly rich countries, Ireland does most to slash inequality. After taxes and transfers, Ireland's income distribution goes from the most skewed in our chart to the middle of the pack. The rich pay a higher share of income tax than in most other countries, while low-earning households receive generous tax credits.

Most countries would struggle to copy the Irish system in full. Part of the reason Ireland is able to do so much redistribution is that it relies more than most on taxes paid by multinational companies. Foreign-owned firms accounted for 80% of corporate tax in 2017. Cross-country data suggest that if America wanted to bring its level of inequality down to the OECD average, it would have to boost government spending to 50% of GDP. That would require increases in taxes across the board—a highly unlikely prospect. ■

**Correction:** In a story on British universities ("Money and meaning", January 26th), we mislabelled the entry tariff for Hull University's medical school as 123 points. It is in fact 184. Sorry.

# Gaining face

**China is using Facebook to build a huge news audience in the developing world**

THE CHINESE COMMUNIST PARTY'S approach to Facebook is, ahem, two-faced. At home, to stop citizens sharing messages it cannot read, it blocks the site. Clever users can defy the ban, but only 3m do. It is easier to use WeChat or Weibo, local rivals that the state watches closely.

Abroad, by contrast, China uses Facebook to dish up propaganda. Squillions of foreigners see its posts. The English-language page of CGTN, a state mouthpiece, has 77m fans—the most of any news site. China now runs five of the six media outlets with the biggest Facebook followings. None had more than 3m fans in 2014. If their current growth rates continue, by 2022 China Daily and CGTN will overtake the page of Cristiano Ronaldo, a footballer, who is Facebook's most followed celebrity.

This has given China a loud bullhorn. In 2018 its news pages yielded 370m likes, shares and comments. Russian trolls produced a mere 40m annual Facebook engagements when targeting American elections, according to the Oxford Internet Institute. Among the Chinese pages' most popular posts are Orwellian titles such as "China human rights report notes violations in US" and "Why is Tibet a target for Western countries to pick on China?"

How has such dross gained so many fans? Perhaps because China has opened news bureaus in many poor countries, where most of them live. Yet the outlets' rapid growth looks improbable when compared with the sluggish rates of other Facebook news pages. Many young users have switched to Instagram and Snapchat.

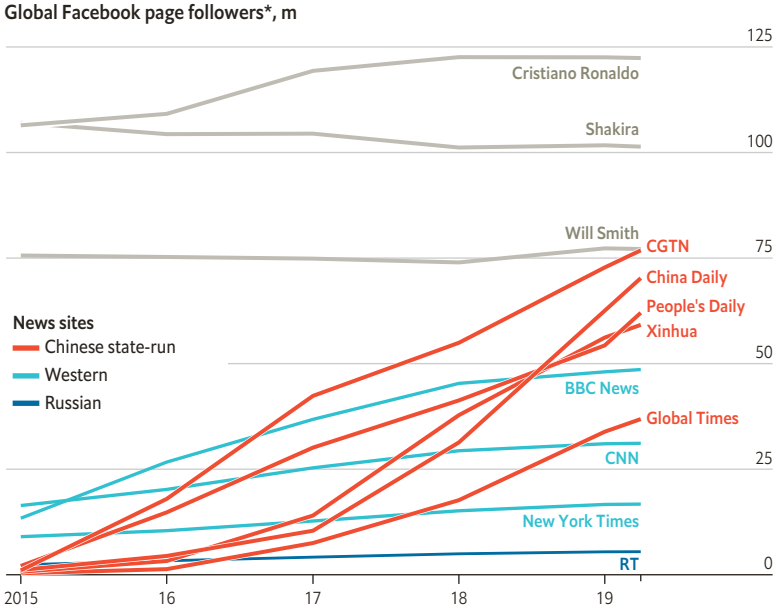
Moreover, Facebook pages usually gain followers when people share posts with their friends. Chinese outlets receive far fewer shares than Western ones do, which implies that they use some other tactic to amass fans. Facebook has already accused Chinese actors of skulduggery. In March it sued four Chinese firms, which it said had sold "fake accounts, likes and followers".

Creating eager, bogus followers—who can fool algorithms into showing posts to more real people—is harder on Facebook than on Twitter. From January to September 2018 the company deleted 2.1bn bots. In response to our findings, Facebook said it would investigate these pages' growth.

It would take a vast effort to hoodwink Facebook to this degree. But China spends $10bn a year on soft power. If anyone could do so, it would be the Communist Party. ■

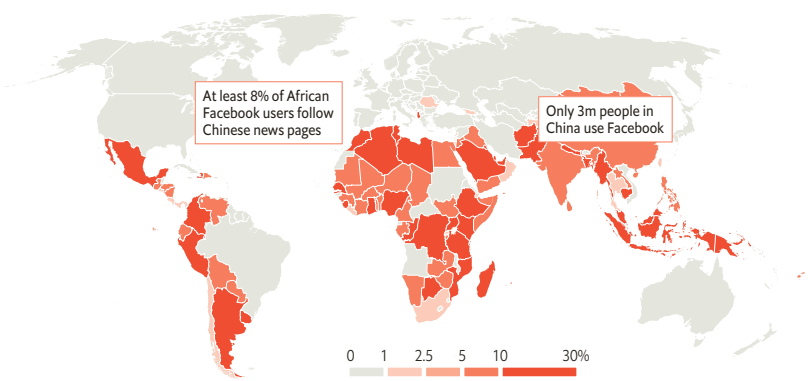
## → Chinese state-run news sites are reaching huge audiences on Facebook

Global Facebook page followers*, m




## → The vast majority of these Facebook followers are outside China

Share of Facebook users who follow at least one Chinese state-run news site
Using fan base of the leading Chinese state-run news site in each country, %




## → Engagement with Chinese propaganda on Facebook is conspicuously low

Most popular Facebook stories about "Africa"

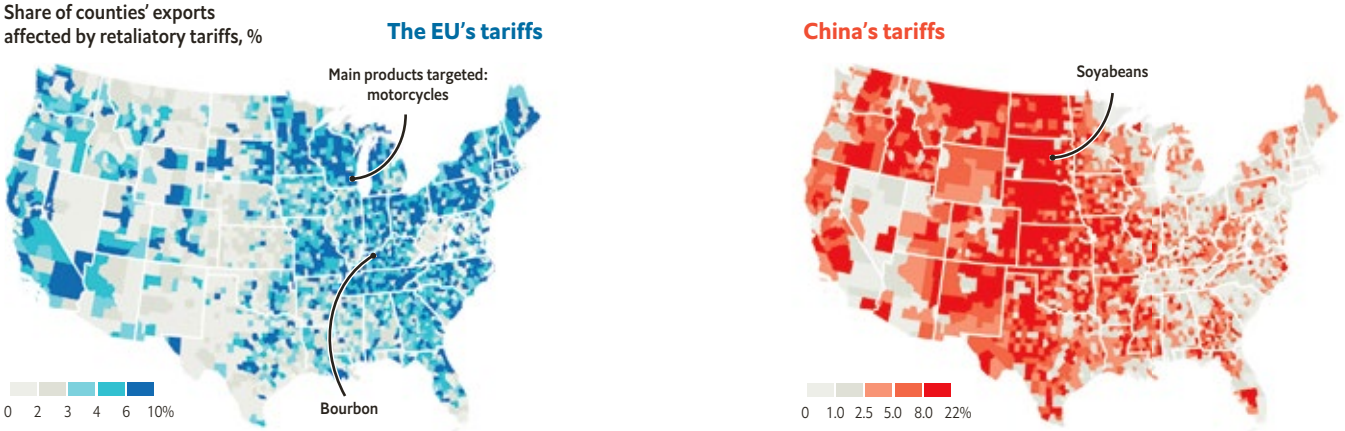
| Chinese state-run news sites | | Western news sites | |
|---|---|---|---|
| *The real situation of African swine fever in China* –CGTN | 3.7k | *Black leopard caught on camera in Kenya* –BBC News | 90.9k |
| *Mali arrests five suspects in killing of 157 villagers* –CGTN | 3.1k | *Suspected rhino poacher killed by elephant and eaten by lions in S. Africa* –CNN | 28.4k |
| *China extends a helping hand to Malawi flood victims* –China Daily | 2.1k | *Last photos of Kenya's 'elephant queen'* –BBC News | 26.0k |
| *Africa inches closer to continental trade agreement* –China Daily | 2.0k | *The richest man who ever lived* –BBC News | 20.3k |
| *Zambian firm starts importing electric cars from China* –Xinhua | 1.9k | *The NBA is launching a professional basketball league in Africa* –CNN | 8.4k |
| *President Xi congratulates inauguration of China-Africa Institute* –CGTN | 1.4k | *Rastafarian 'god' gets African statue* –BBC News | 7.4k |

Sources: CrowdTangle; Socialbakers; Internet World Stats

*On January 1st each year and April 1st 2019

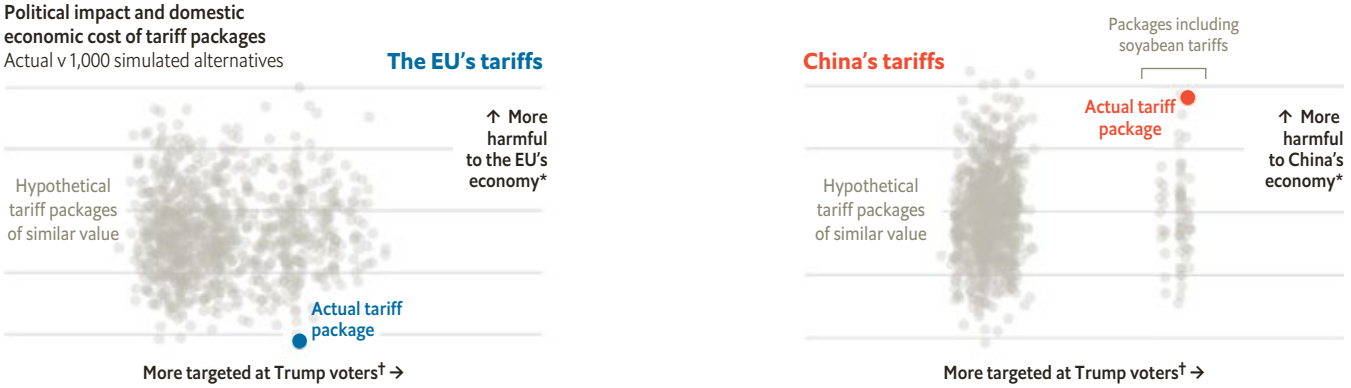
**America's trading rivals have aimed tariffs at Trump voters: Europe in the Rust Belt, China in the Great Plains**

Share of counties' exports affected by retaliatory tariffs, %




**The EU tried to minimise the harm of its tariffs to its own economies. China showed no such concern**

Political impact and domestic economic cost of tariff packages
Actual v 1,000 simulated alternatives




*Share of retaliating country's total imports of targeted goods that come from the US †Impact of change in Republican presidential vote share from 2012-16 on probability of a county being in the top 10% of exposure to retaliatory tariffs
Source: "Tariffs and Politics: Evidence from Trump's Trade Wars", working paper by T. Fetzer and C. Schwarz, 2019

# You get what you give

### Why you should never start a trade war with an autocracy

ECONOMISTS OFTEN argue that trade wars cannot be won. Yet they will be among the few beneficiaries from America's barrage of tariffs. For decades, rich countries' sound trade policies denied academics cases of tit-for-tat protectionism to study. But new American taxes on many goods from China and metals from everywhere have produced the data set of their dreams.

America's government seems unfazed by the damage its tariffs do to the economy. One study by scholars at the Federal Reserve and Princeton and Columbia Universities found that the new levies have raised costs for consumers by $1.4bn per month.

However, Donald Trump is devoted to his voters. And his trading rivals have retaliated where it hurts. A paper by Joseph Parilla and Max Bouchet of the Brookings Institution, a think-tank, estimated that 61% of jobs affected by retaliatory tariffs are in counties that voted for Mr Trump.

Is this a coincidence? If a country's imports from America already come from mostly Republican areas, those regions will bear the brunt of a trade war. However, a new paper by Thiemo Fetzer and Carlo Schwarz of the University of Warwick finds that America's rivals probably did consider politics when crafting their policies.

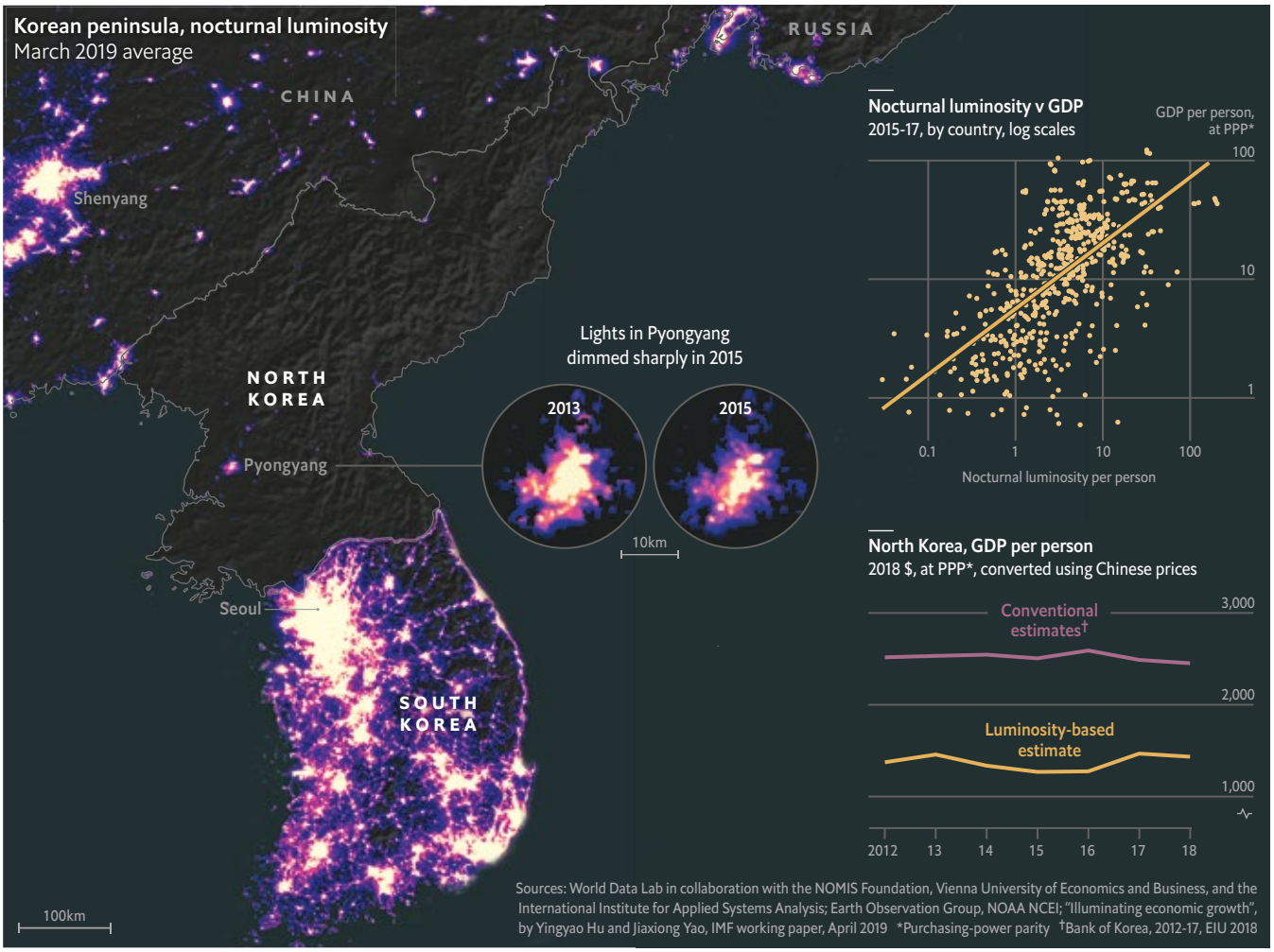
To test if recent tariffs were politically motivated, the authors needed to compare them with alternatives that were not. They devised this benchmark by creating at random 1,000 hypothetical bundles of targeted goods for each trading partner, all worth the same as the actual trade facing tariffs.

The authors then compared real-world policies with these alternatives. First, they assessed the political impact of each plan, by measuring how closely its targeted areas matched Republican gains when Mr Trump was elected. Next, they estimated how much each policy would harm a retaliating bloc's own economy, by counting the share of its imports of the chosen goods that come from America. The more a country relies on one supplier, the more switching to a less efficient source is likely to hurt.

The study found that the EU prioritised minimising such damage. Its tariffs deftly protected domestic consumers, causing less disruption than 99% of alternatives. The bloc targeted Trump voters as well—its tariffs matched the election of 2016 more closely than in 87% of simulations—but not at the cost of upsetting its own citizens.

In contrast, China focused on punishing Trump voters. Its tariffs tracked the election better than 99% of alternatives. They also disrupted China's own economy more than in 99% of simulations. Even among plans including soyabeans—one of China's main imports, grown mostly in Republican areas—China's policy was just slightly more politically targeted than similar options, but far worse for its economy.

China's choice of tariffs seems designed to deter escalation at any cost. Only regimes with no voters to satisfy can run that risk. The lesson is clear: if you start a trade war, fight a democracy, not an autocracy. ■




# When the lights go out

**Satellite data shed new light on North Korea's opaque economy**

Viewed from space at night, North Korea looks like the recently released first image of a black hole: an abyss, ringed by the brilliant glow of South Korea, China and Russia, from which nothing can escape. But the Hermit Kingdom does emit a bit of light, which orbiting satellites detect. And nocturnal luminosity is one of the few reliable sources of information about the country. It implies that North Korea's economy is poorer, more volatile and more vulnerable to weather than formerly thought.

Night lights are a strong proxy for economic activity. A new paper by the IMF finds that they explain 44% of the variation in countries' GDP per person—as close a tie as that between a person's height and hand size. In places where records are poor or manipulated, night lights offer an alternative measure of output. One study found that among countries with similar luminosity, autocracies reported GDP growth 15-30% higher than democracies did.

Nowhere are good economic data rarer than in North Korea. The most detailed numbers come from South Korea's central bank, which derives them from figures on production volumes of various goods. When adjusted for the cost of living in a developing Asian economy, the bank's most recent estimate of North Korea's annual GDP per person is enough to buy goods and services that would cost $2,500 in America.

The picture painted by night lights, however, is even grimmer. In 2013 a group of scholars compared luminosity and GDP within rural China, obtaining an equation to estimate economic output from light. A forthcoming paper by World Data Lab, a startup, and a team of researchers applies this formula to North Korea. It yields a standard of living that would cost $1,400 a year in America, making North Korea one of the world's ten poorest countries.

The data also suggest that the economy has been unusually volatile. In 2013-15 luminosity fell by 40%. That implies a 12% reduction in GDP, including 19% in the capital region, Pyongyang. Since 2016, however, the country has brightened again.

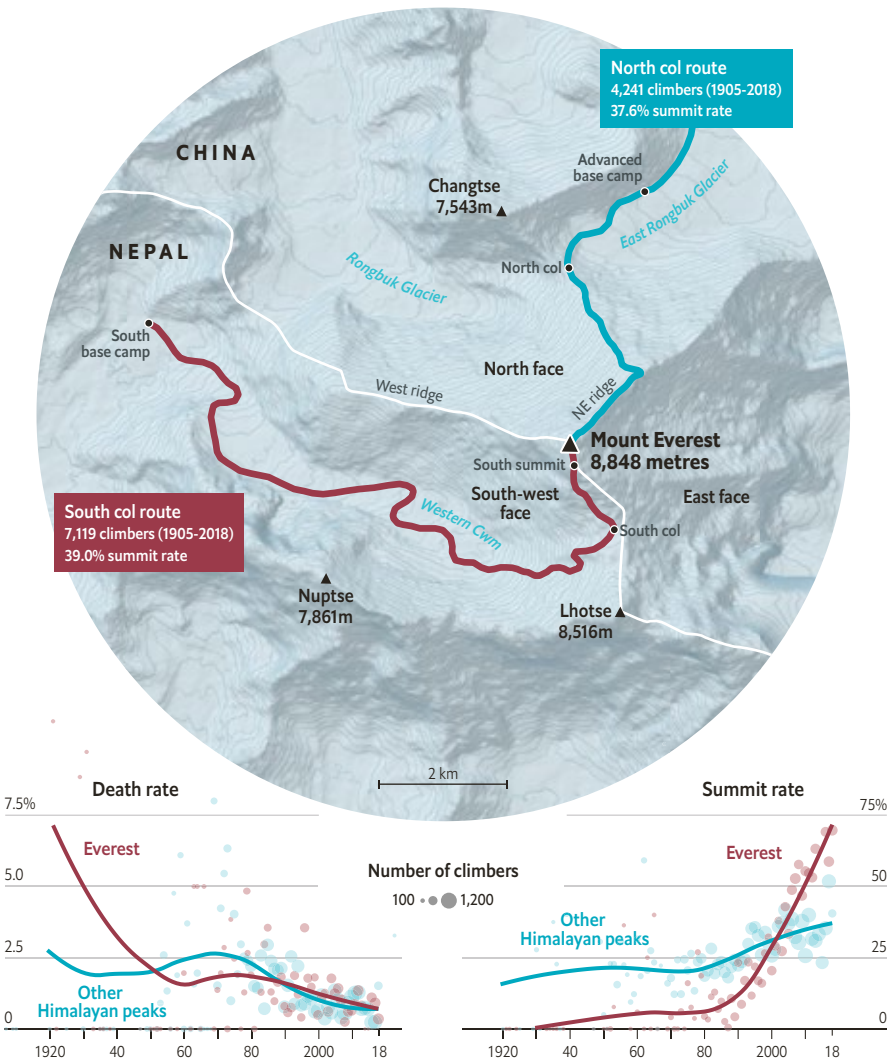
International sanctions are unlikely to have produced this darkening. They were made stricter in 2016-17, just as luminosity rose. A drop in the prices of North Korean exports, like coal, may have played a part.

But the main cause was probably weather. North Korea relies on hydropower, and in 2015 it was parched by a drought. The Bank of Korea also reckons that electricity, gas and water output fell by 13% in 2015.

The economy may not have shrunk as much as the dimming suggests. Recessions caused by power cuts could disproportionately reduce lighting. Many North Koreans own solar panels, which power daytime activity not shown in night lights. And state buildings, whose illumination is a political choice, make up much of the capital's glow. As with physics inside a black hole, no one knows what economic laws apply within North Korea's eerie silhouette.

Nonetheless, a 40% drop in luminosity indicates a serious recession. And this year the government has admitted publicly that heatwaves, floods and drought have caused a dire food shortfall. The regime appears much better prepared to weather trade sanctions than the wrath of nature. ■

### Compared with other Himalayan peaks, climbing Everest is getting easier



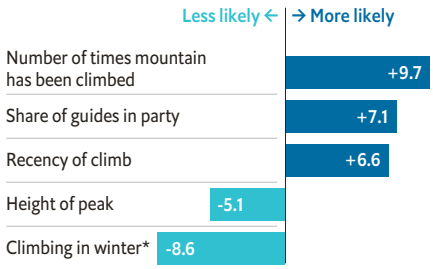




### Climbers' odds of success vary based on when, how high and with whom they climb

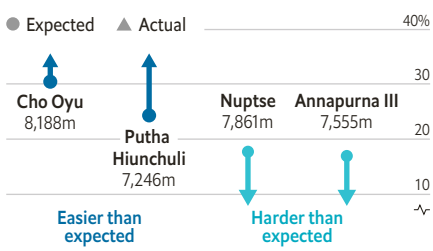
**Factors with biggest impact on probability of reaching a Himalayan summit**

%-point change for every one-standard-deviation increase, relative to an average climb




**Expected rate of reaching summit v actual**

Based on factors listed above



Source: Himalayan Database. *All figures exclude guides. Chinese and Nepalese peaks only.* *Compared with other seasons

# Not so rare air

**Climbers' success rate on Everest is higher than any other Himalayan peak**

BEFORE EDMUND HILLARY and Tenzing Norgay set foot on the summit of Mount Everest in 1953, at least 145 other climbers had tried and failed to reach Earth's highest point. In 1924 a British team got within 250 metres of the top, but turned back after two members (who may or may not have reached the peak) vanished.

Scaling Everest was scarcely easier afterwards. Excluding guides, just 9% of people making an attempt reached the summit from 1954-83, while 2% died. As climate change thaws the snow, the remains of many of these victims have emerged—including one of the lost climbers from 1924.

But since the 1990s, the pinnacle of mountaineering has become accessible. In 1994-2003, 24% of Everest climbers got to the top, double the rate in the previous decade. The share doubled again, to 51%, in 2004-13. In the past three complete climbing seasons, 66% have made it. The first summit attempts of 2019 are due this week.

Technology accounts for some of these gains. Oxygen tanks deliver twice as much gas as before, and suffer fewer leaks. Suits and gloves made from high-quality down and double-insulated boots keep climbers warmer. And better weather forecasting has minimised unpleasant surprises.

However, these advances help just as much on other peaks. And summit rates elsewhere have risen much less. Among the 13 Himalayan mountains with available records that were climbed by at least 40 people since 2016, Everest's summit rate was the fourth-lowest before 1994. In the past three years it has been the highest.

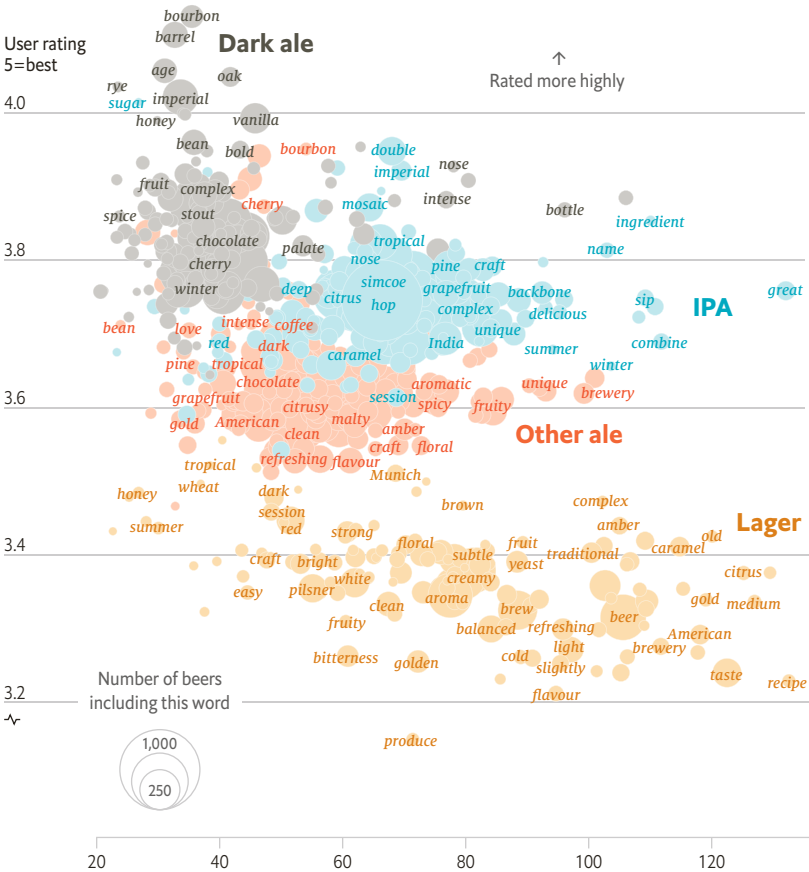
Two factors probably account for this trend. First, Sherpas set up ladders and ropes along the entirety of the two most popular Everest routes, which are used by 98% of climbers. This work is perilous—an avalanche killed 16 Sherpas in 2014—but makes the ascent easier for foreigners.

In addition, the bulk of Everest climbers today hire private firms to bring them up and down alive. In contrast, grizzled daredevils seek harder challenges on other mountains. A few peaks stand out for their difficulty, after adjusting for factors like their height; the season, year and number of guides for each expedition; and how many people have tried to ascend them. Climbers on popular routes benefit from greater infrastructure and know-how.

Take Nuptse, whose snow is especially loose and dangerous. Just 8% of its climbers have succeeded, less than half the 19% predicted by a model we built using the factors above. Its victims include Ueli Steck, a renowned alpinist who fell 1km to his death in 2017. Another siren is the Annapurna massif. For every ten people to reach its three highest summits, three have died trying. The latest perished just last week. ■

**The beers online raters drink most are the ones they claim to like least**

Average ratings for beers whose descriptions include these words, by beer type




Ratings for the 25 beers in each category with the most reported consumption

Sources: Untappd; Brewers Association

# Familiarity Fosters contempt

**Beer snobs guzzle lagers they claim to dislike. How long can that last?**

CARLSBERG, A DANISH brewery, used to boast that its lager was "probably the best beer in the world". No longer. In March it began selling a new pilsner—a pale, Czech-style lager—after admitting that drinkers had soured on its original recipe.

Data from Untappd, a beer-rating site with 7m (mostly American) users, confirm that pontificating pint-swillers turn their noses up at mass-market lager. Among the 5,000 beers its users reported drinking most often, lagers—made with "bottom-fermenting" yeast, which yields a light-bodied, mild brew—are rated 3.29 out of 5 on average. The rest get an average of 3.69.

Moreover, the lagers online raters like most don't taste like lager. When grouped by the words in Untappd descriptions (many copied from labels), the best-rated terms are ones mostly used for ale, such as "tropical" and "dark". Yet despite such poor reviews, the specific beers Untappd users say they drink most often are lagers. Why?

One explanation is fragmentation. Though reported consumption tends to be higher for individual lagers than for ales, there are far more ales than lagers. As a result, ales account for 73% of drinking of the 5,000 leading beers recorded on Untappd.

But crowd-sourced data are a poor measure of overall demand. According to IWSR, a research firm, Americans buy six times as much mass-market lager as craft beer.

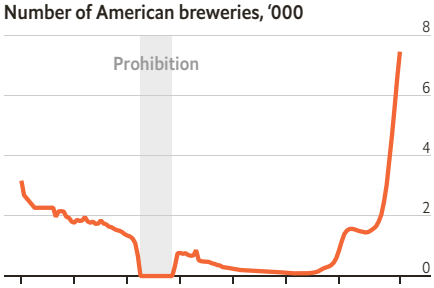
Most drinkers are not beer snobs, and even ale devotees might secretly enjoy a frosty lager on a hot day. And most importantly, lagers dominate supply chains. Craft ales abound at organic grocers and hipster bars; Carlsberg (rated 2.96) and Budweiser (2.54) are everywhere.

Low costs originally gave lager its distribution advantage. Its cold fermentation translates well to large batches, and using fewer hops saves money. In the 19th century these economies of scale let big firms flood America with watery lager. Prohibition reinforced this pattern: most craft houses closed shop for good, while large producers resumed brewing afterwards.

In recent years the market as a whole has inched closer to Untappd users' preferences. In 2010-18 American consumption of mass-market lager fell by 12.5%, while that of craft beer doubled—even though craft costs 67% more than lager on average.

Unfortunately for the beer industry, it sells so much lager that this switch has hurt it. Real revenues in America are down 9% since 2010. Giants like Carlsberg face an extra obstacle. Even if they launch or buy a rich, craft-style ale, snobs may shun it because it was made by a behemoth. ■

Number of American breweries, '000



# Not-so-cold comfort

**China is surprisingly carbon-efficient —but still the world's biggest emitter**

With its four-tiered smog warnings and lethal dumps of toxic waste, China has become Exhibit A for the environmental costs of economic development. Its growing meat consumption and reliance on fossil fuels have also made it a focus for people worried about climate change.

In one sense, China's reputation as the bellows of "hothouse Earth" is overblown. Since 1850 countries with a GDP per head of $12,000-16,000 in 2019 dollars have produced a population-weighted average of 10.6 tonnes of carbon dioxide-equivalent gases per person per year. In 2016 China's GDP per head was $14,000, and it emitted just 9.3 tonnes per person.

Moreover, China pollutes far less per person than Western countries did at the same stage of development. When America, France, Britain and Germany had incomes similar to modern China's, they relied on inefficient power stations and cars, and spewed out 16.6 tonnes per person.

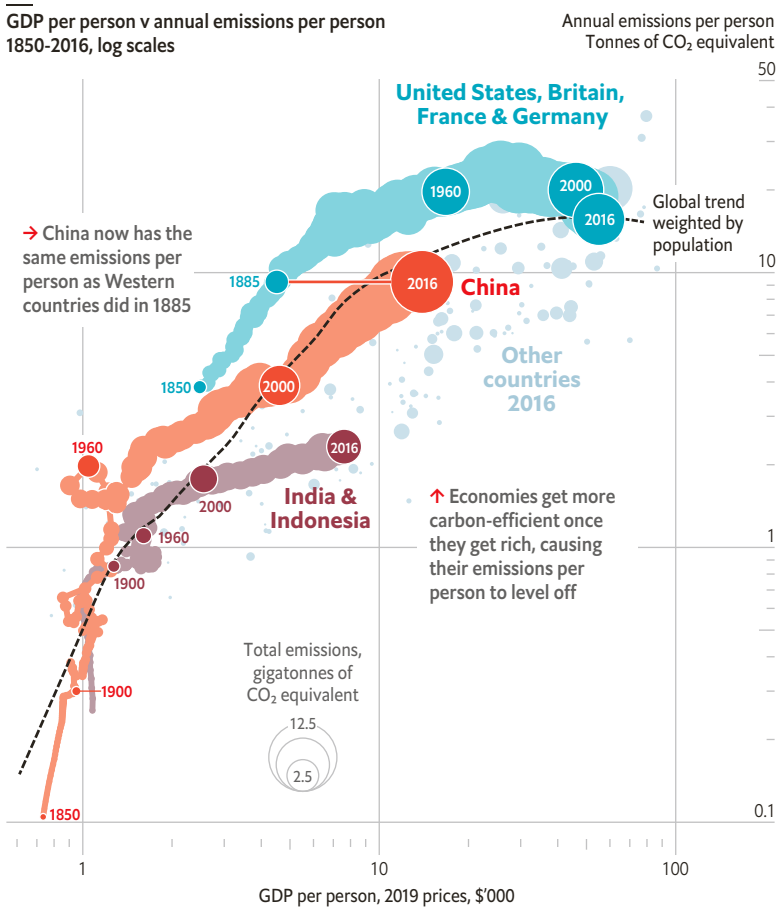
The combination of China's huge population and rapid GDP growth has nonetheless made it the world's biggest emitter of carbon. China is predicted to produce 16bn tonnes of greenhouse gases in 2030—four times the entire world's output in 1900.

To prevent the stock of greenhouse gases in the atmosphere from reaching levels likely to cause disastrous warming, China must do better than merely beating the past records of richer countries. Instead, it will need an unprecedented decline in emissions per head—at least to the more carbon-efficient level of similarly rich Latin American economies, and ideally onto the trajectory of poorer Asian giants like India and Indonesia, which rely less on heavy industry and manufacturing. Those countries, perched at the sweltering latitudes where farmers will be most hurt by climate change, must in turn work out how to reach upper-middle-income status without replicating China's emissions path.

To their credit, Chinese authorities, spurred by public concern about air pollution, have prioritised green policies, such as switching from coal-fired power stations to renewable sources and setting up an emissions-trading system. China's annual rate of emissions growth has fallen from 9.3% in 2002-11 to 0.6% in 2012-16. The waning of its cement-intensive construction boom should slow emissions further. But it will take more than incremental gains to stave off severe warming. ■

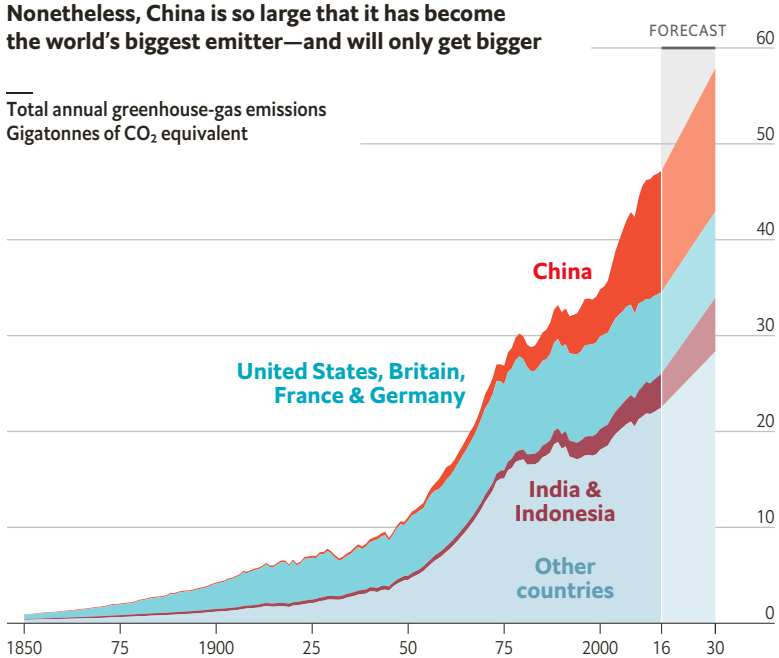
**China emits far less greenhouse gas per person than Western countries did at the same stage of economic development**

GDP per person v annual emissions per person
1850-2016, log scales




**Nonetheless, China is so large that it has become the world's biggest emitter—and will only get bigger**

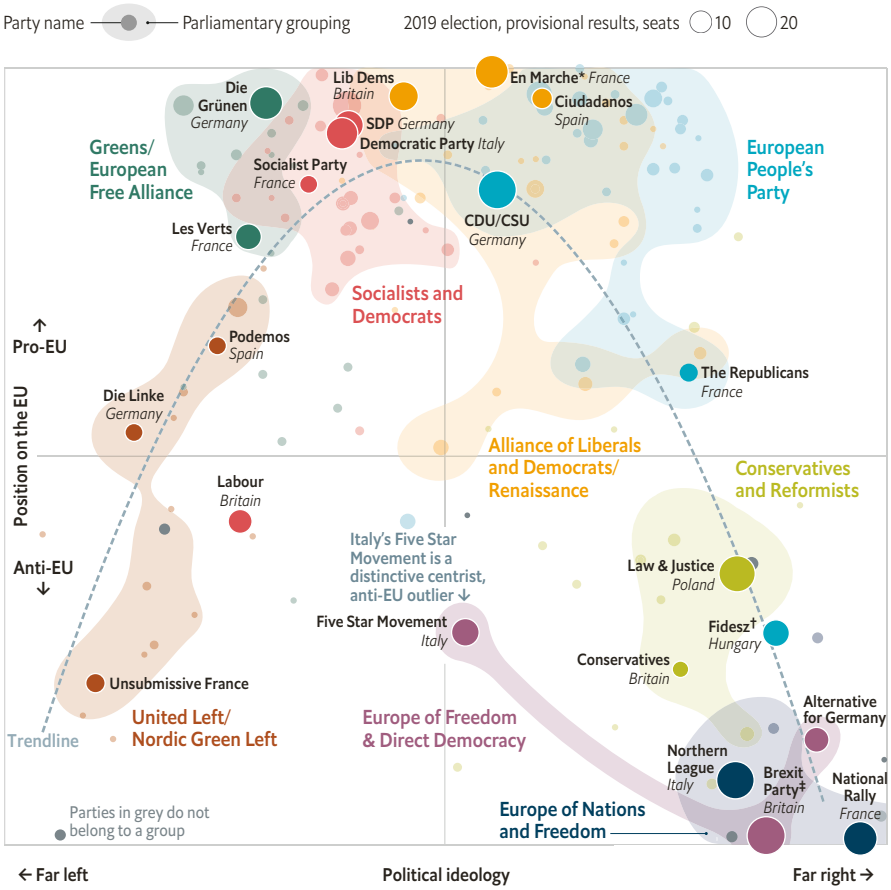
Total annual greenhouse-gas emissions
Gigatonnes of $CO_2$ equivalent



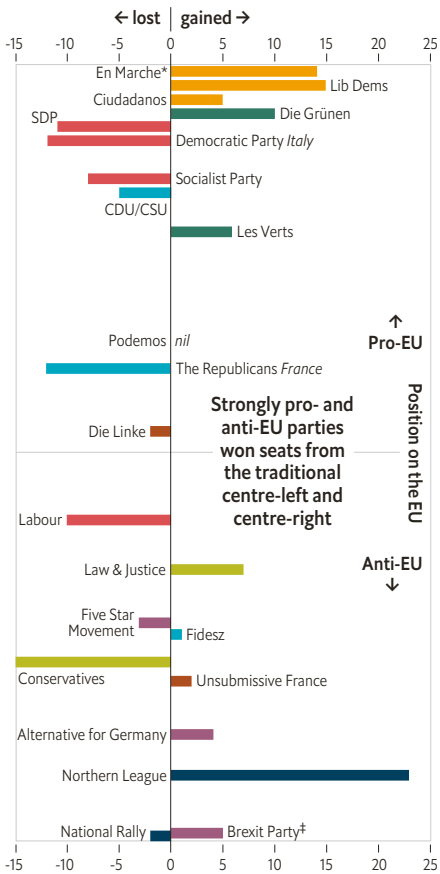

Sources: Climate Action Tracker; Climate Watch; University of Groningen Growth and Development Centre; UN Intergovernmental Panel on Climate Change

## Anti-EU parties cluster at ideological extremes, whereas pro-EU ones are centrist

**European Parliament political parties and groupings**
By ideology and position on the EU




**Change in seats from 2014 to 2019 elections**
Selected parties, by position on the EU




Sources: Chapel Hill Expert Survey (2014/2017); ECFR; European Parliament

*Includes MoDem and UDI †Currently suspended from the EPP group ‡Ideology and difference based on UKIP 2014

# An equal and opposite reaction

### Centrist liberals, not populists, gained the most power in the EU Parliament

EUROSCEPTICS HOPED that populist parties would sweep last week's European Parliament elections. But voters delivered a murky verdict. Eurosceptics did make progress: parties in the top 15% of hostility towards the EU, as measured by a survey of political scientists run by the University of North Carolina at Chapel Hill, gained 30 seats. Yet parties in the most pro-EU 15% won 32 extra seats. The losers were the main centre-left and centre-right parties.

For the first time in the parliament's history, its two main blocs, the European People's Party and the Socialists and Democrats, failed to achieve a majority between them. In theory, that could turn the Eurosceptics into kingmakers. In practice, the older parties back the EU and want nothing to do with the populists. That will force them to depend on the liberals instead. Moreover, the pro-EU parties are likely to form a more cohesive group than their adversaries will.

Almost every possible mix of policy positions is present among the parliament's 177 different parties. However, the Chapel Hill survey shows that some combinations tend to go together. Its authors assess parties' views on dozens of issues, and aggregate them into ideological scores. The study was last run in 2017, so its ratings do not count recent political shifts. Nonetheless, its scores track well with other surveys, and with parties' own manifestos.

One pattern is the boomerang-shaped relationship between views on the EU on one hand, and older divides over economic redistribution and cultural openness on the other. Before the global financial crisis, Euroscepticism won few votes. But the EU's bailouts of bankrupt member states and struggles to absorb refugees linked opposition to European integration with hostility towards bankers and foreigners. Sensing a chance to broaden their scope, far-right and far-left parties sharpened their criticism of the EU, and Eurosceptic parties became more radical on other issues.

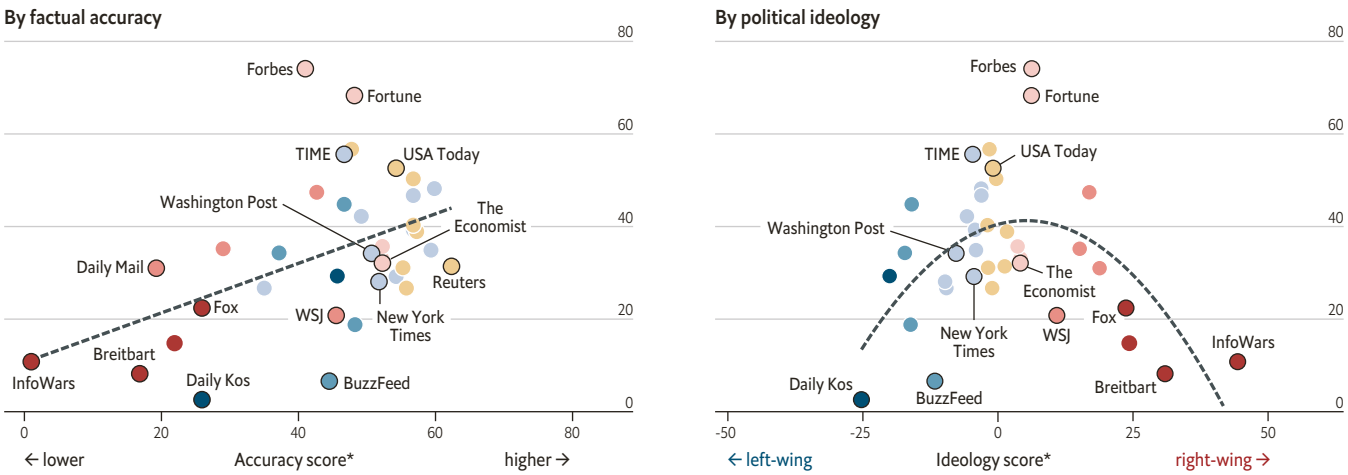
As a result, today's anti-EU parties mostly land on either the far left (such as Unsubmissive France) or far right (like the Alternative for Germany). These two wings will struggle to find common cause over economic policy. The biggest exception, Italy's Five Star Movement, sits in the centre only because it combines policies from both left and right extremes.

In contrast, the surging pro-EU parties, including France's En Marche and Britain's Liberal Democrats, have much in common. They combine cultural liberalism with a centrist economic agenda emphasising equitable growth. These parties also tend to back efforts to fight climate change, making them natural allies of the Green parties that gained seats across Europe.

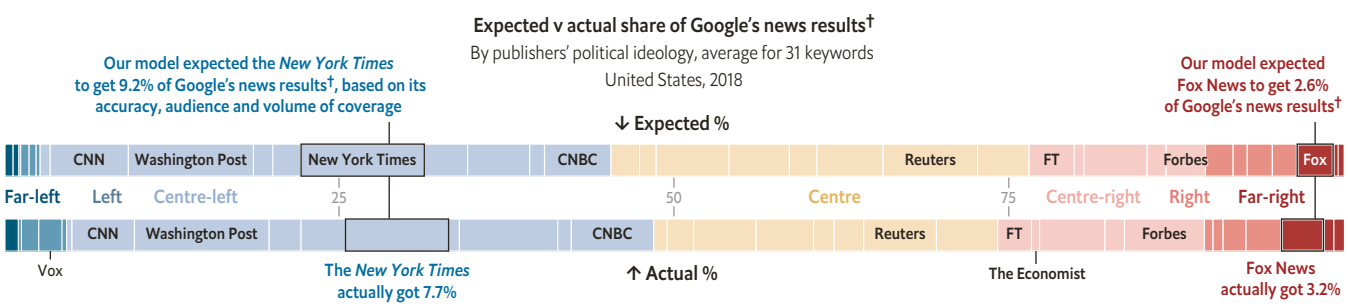
European Parliament elections are sometimes dismissed as a mere opinion poll, since the body has much less power than domestic legislatures do. In terms of votes cast, pro- and anti-EU forces battled to a draw. But the parliament also has real duties, including approving the EU's budget and laws. By this measure, liberals may have won the upper hand. ■

→ **Google's news search favours trustworthy publications. Such sources are rarely politically extreme**

Share of website's traffic that comes from search engines, February 2019, %




→ **We built a statistical model to predict publications' share of Google's news results. It did not reveal consistent political bias**




*From fact-checking websites Adfontesmedia.com and Mediabiasfactcheck.com †Share of results among a sample of 37 publications
Sources: Google; YouGov; Meltwater; SimilarWeb; Pulitzer.org; Facebook

# Seek and you shall find

### Google rewards reputable reporting, not left-wing politics

"GOOGLE & OTHERS are suppressing voices of Conservatives", tweeted Donald Trump in 2018. "They are controlling what we can & cannot see." The president's charges of bias are often dubious. But many people worry about algorithms absorbing human prejudices. Robert Epstein, an academic, has compiled data that show Google suggesting more positive terms when users type "Hillary Clinton" than when they look up Mr Trump. PJ Media, a conservative blog, claims that liberal sites get 96% of results for "Trump" on Google's news page, a compilation of links to recent articles.

Google says that the 10,000 human evaluators who rate sources for its search engine assess "expertise" and "trustworthiness" but not ideology. Web-traffic figures support this defence. Sites with high scores from fact-checking groups, whose judgments probably resemble Google's, draw larger shares of their visitors from search engines than sites with low scores do. Factually inaccurate sources also tend to have strong left- or right-wing slants.

Nonetheless, a subtle bias might not show up in such broad statistics. To test for favouritism, *The Economist* ran an experiment, comparing a news site's share of search results with a statistical prediction based on its output, reach and accuracy.

We first wrote a program to obtain Google results for any keyword. Using a browser with no history, in a politically centrist part of Kansas, we searched for 31 terms for each day in 2018, yielding 175,000 links.

Next, we built a model to predict each site's share of the links Google produces for each keyword, based on the premise that search results should reflect accuracy and audience size, as Google claims. We started with each outlet's popularity on social media and, using data from Meltwater, a media-tracking firm, how often they covered each topic. We also used accuracy ratings from fact-checking websites, tallies of Pulitzer prizes and results from a poll by YouGov about Americans' trust in 37 sources.

If Google favoured liberals, left-wing sites would appear more often than our model predicted, and right-wing ones less. We saw no such trend. Overall, centre-left sites like the *New York Times* got the most links—but only about as many as our model suggested. Fox News beat its modest expectations. Because most far-right outlets had bad trust scores, they got few search results. But so did Daily Kos, a far-left site.

Our study does not prove Google is impartial. In theory, Google could serve unbiased links only to users without a browsing history. If fact-checkers and Pulitzer voters are partisan, our model will be too.

Moreover, some keywords did suggest bias—in both directions. Just as PJ Media charged, the *New York Times* was over-represented on searches for "Trump". However, searches for "crime" leaned right: Fox News got far more links than expected.

This implies that Google's main form of favouritism is to boost viral articles. The most incendiary stories about Mr Trump come from leftist sources. Gory crime coverage is more prevalent on right-leaning sites. Readers will keep clicking on both. ■

**Cricket has evolved from a slow-moving game into three very different ones**

### Test

**Matches stop after five days**
Each team bats for two innings of unlimited balls. To avoid being bowled out quickly, batsmen often block the ball defensively.

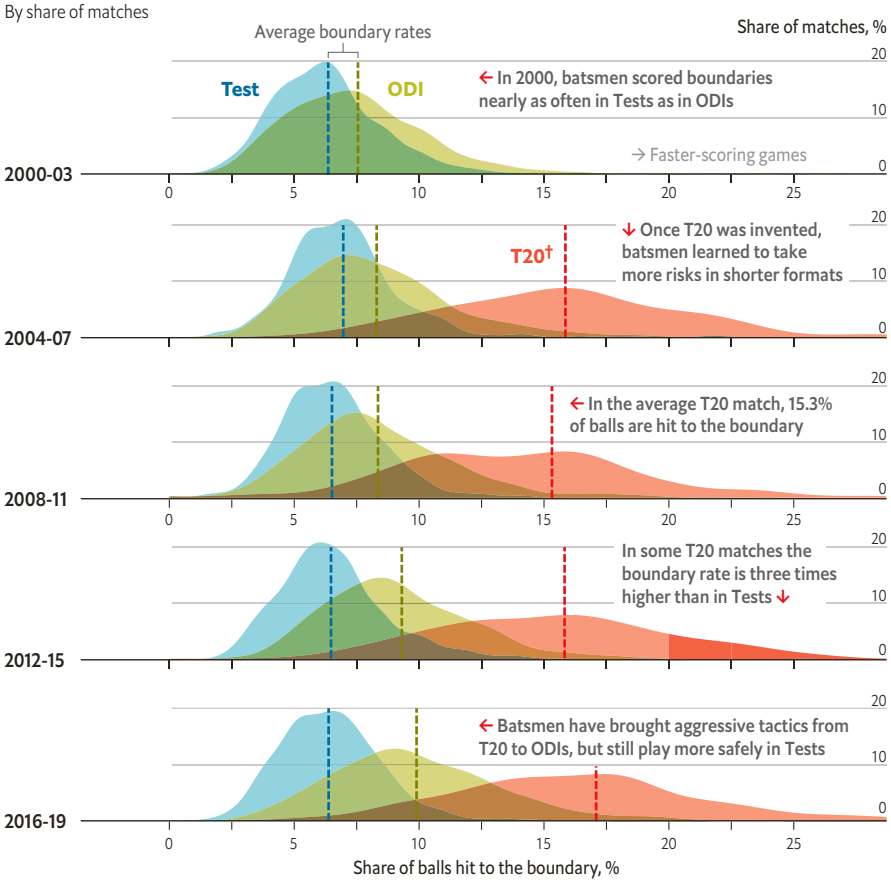
### One-day international (ODI)

**Matches take one day**
Each team bats for one innings of 300 balls. Because opportunities to score are limited, batsmen play risky shots more often than in Test matches.

### T20

**Matches take four hours**
Each team bats for one innings of 120 balls. Batsmen look to hit most balls to the boundary, because it is unlikely the whole team will be bowled out.

**Rate of boundary shots*, by match format**
By share of matches




*A shot that reaches the edge of the pitch †Includes Indian Premier League Sources: Cricinfo.com; Cricsheet.org; Navaneesh Kumar

# Beyond a boundary

**The sport's increasing sizzle owes much to India**

CRICKET MATCHES between India and Pakistan are always heated. Their World Cup fixture on June 16th will be particularly fierce: in February an attack by militants on Indian police in Kashmir led to tit-for-tat airstrikes. Even neutral spectators, however, eagerly await pyrotechnics on the pitch. Scoring rates in cricket have been rising for decades, but in recent years they have exploded in the sport's newer, shorter formats. The game's evolution into a faster-paced, more exciting spectacle has been most notable in India. The Indian Premier League (IPL), founded in 2008, has become cricket's most lucrative product by copying the franchise system of American sports and importing star foreign players in a huge country with growing TV viewership.

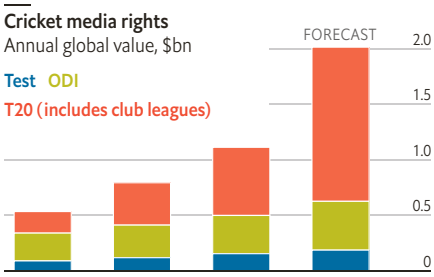
The IPL's other innovation was to adopt the T20 format, devised in England in 2003. Unlike Test matches—in which each team bats for two innings, taking up to five days—T20 gives each side one innings of 120 balls, limiting games to four hours. The rules are the same. Batsmen score as many runs as possible during an innings. Whacking the ball over the boundary rope yields four runs if it bounces on the field, and six if it does not. The fielders try to get the batsmen out by hitting the wooden wicket or catching an errant shot (among other methods of dismissal). Each side bats until either ten players are out or the fixed number of balls, or days, is used up.

In Test cricket batsmen often block the ball defensively, to preserve their wickets. But because it is rare for ten men to get out in just 120 balls, players in T20 try riskier shots in pursuit of faster rewards. The result makes baseball look sedate. Whereas an average night at Yankee Stadium produces two home runs, an average T20 match features 39 boundary shots.

These aggressive tactics have also been adopted in one-day internationals (ODIs), the format used in the World Cup, which gives each side one innings of 300 balls. Boundary rates in ODIs have soared since 2003. In contrast, the long increase of run-scoring in Tests stopped just when T20 was invented. It may not be possible to hit much more than 6.4% of balls to the boundary, as batting teams did in 2000-03, while occupying the crease for five days.

Purists insist that slow-building Tests are more gripping than a flurry of sixes. But a survey of fans in 2018 found that only 69% are interested in Tests, rising to 92% for T20. Media Partners Asia, a consultancy, expects broadcasters to pay $1.4bn a year for T20 over the next four years, compared with $190m for Tests. England and Australia hope to emulate the IPL's success, using a similar template. Once a sporting imitator, India is now setting the trend. ■

**Cricket media rights**
Annual global value, $bn




Source: Media Partners Asia

# Missing millions

### The UN revises down its population forecasts

THE UNITED NATIONS is the world's most important watcher of human tides. Its demographers have a good record of predicting global population change, although they have made mistakes about individual countries. So it is worth paying attention when the UN revises its figures, as it does every few years. The latest bulletin is especially surprising.

Recent revisions have sent the projected global population upwards. The one released on June 17th cuts it back. The UN now thinks the world will contain a little over 9.7bn people in 2050 and just under 10.9bn in 2100. The first figure is 37m lower than the UN forecast two years ago. The latter is 309m lower—almost an America's worth of people revised away.

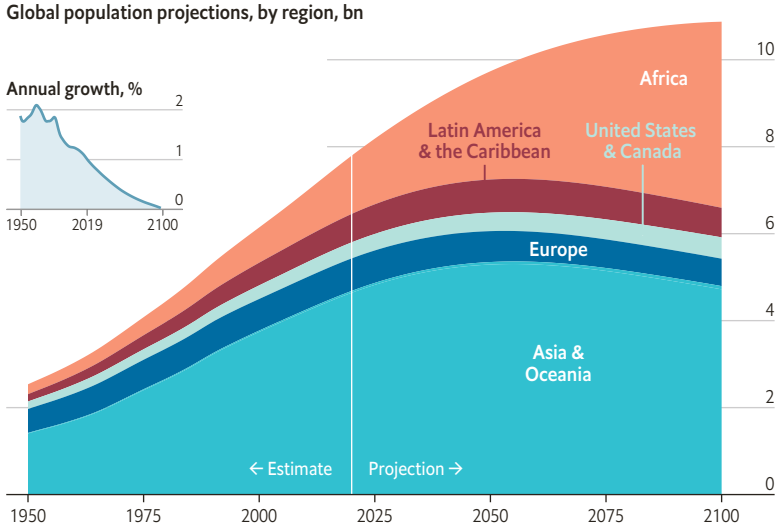
Birth rates are falling faster than expected in some developing countries. In the late 1980s Kenya had a fertility rate of 6.5, implying a woman could expect to have that many children. Two years ago the UN reckoned Kenya's fertility rate would drop to 2.1 (the point at which the population sustains itself naturally) only in the late 2070s. Because of new data, it now thinks Kenya will reach that point a decade earlier. Uganda also looks less fecund. A smaller cut to India's fertility rate has a big effect on the global population forecasts because India has so many people.

The UN's population model assumes that countries with fertility rates well below two will bounce back a little. Even in countries where babies have become rare, most people continue to believe that the ideal family contains two or even three kids. But the recovery keeps failing to happen in some places, so the demographers have changed their forecasts in a second way. They now expect some countries with extremely low birth rates, such as Italy, Japan and South Korea, to stay that way for years. Korea, which has a fertility rate of just 1.1, is now expected to have 30m people in 2100—down from 51m today.

Another change has to do with death. Most people are living longer. The biggest improvement is in east and southern Africa, where HIV is being treated better. In America, however, the opioid epidemic has pushed up the death rate, especially for men. The chance of a 15-year-old boy dying by the age of 50 is now higher in America than in Bangladesh. It would be nice if the American forecast, at least, proved to be too pessimistic. ■

**→ This century, Africa will replace Asia as the driver of population growth**

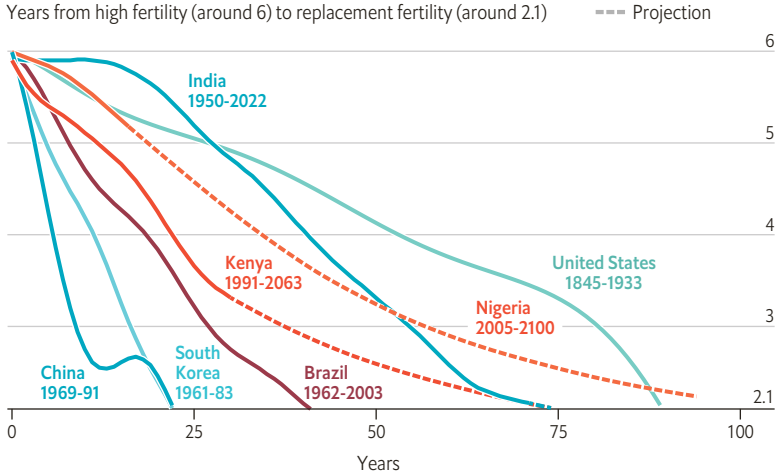
Global population projections, by region, bn




**→ Birth rates have fallen everywhere, faster than they did in the West**

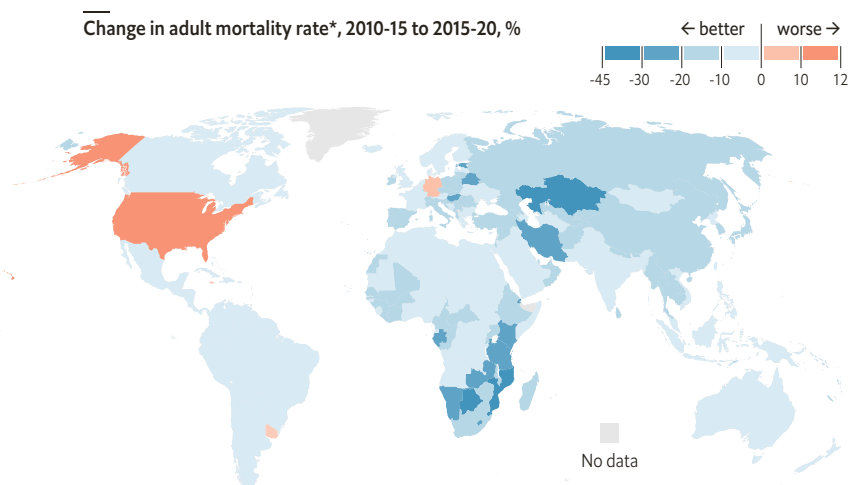
Total fertility rate, children per woman

Years from high fertility (around 6) to replacement fertility (around 2.1) — Projection




**→ In Africa, prescription drugs save lives. In America they are ending them**

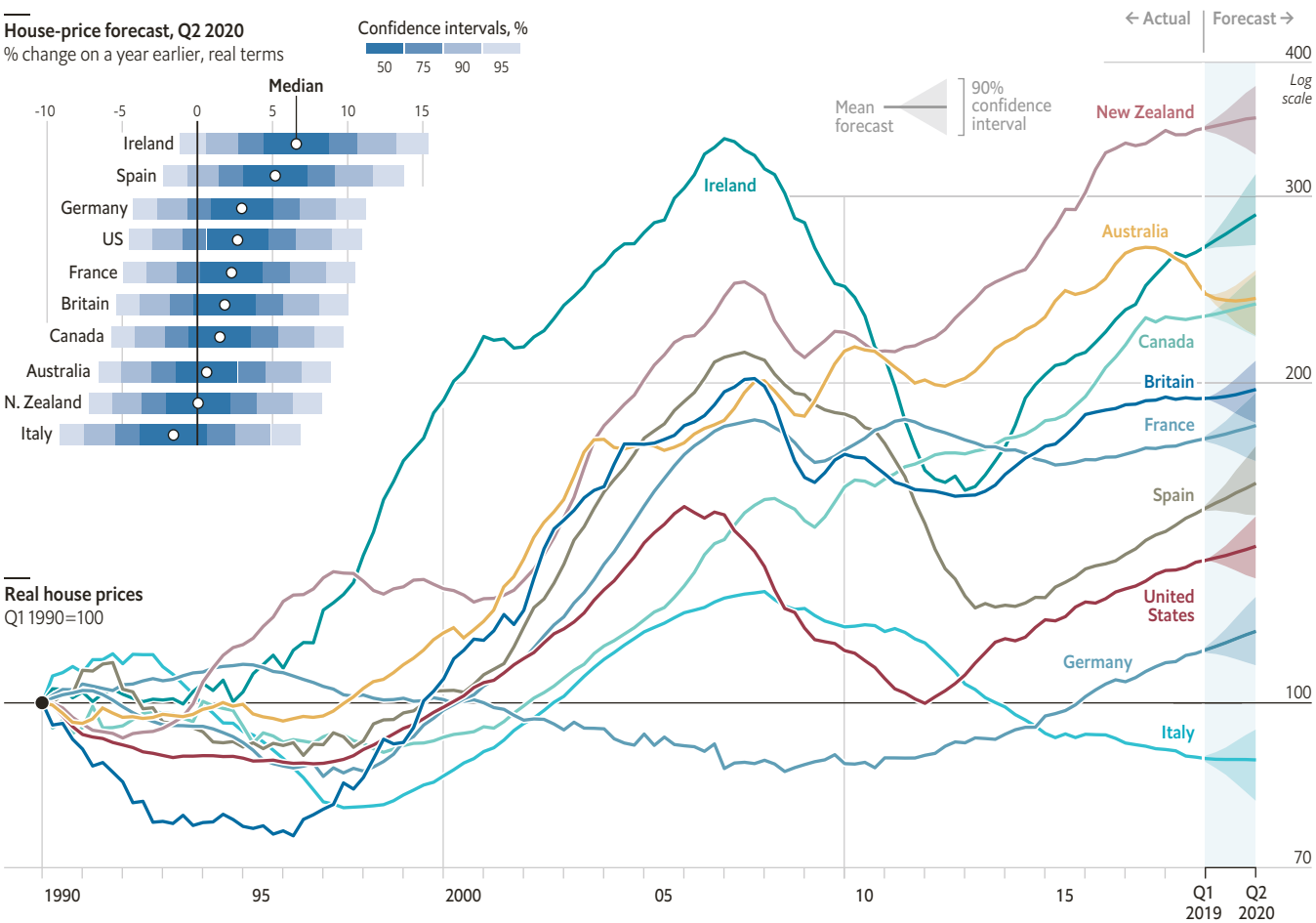
Change in adult mortality rate*, 2010-15 to 2015-20, %




Sources: UN; Gapminder

*Deaths under age 50 per 1,000 alive at age 15

**A decade after the financial crisis, house prices are at new highs**




Sources: OECD; BIS; IMF; national statistics; *The Economist*

# As safe as houses

**Our model finds that prices are likely to keep rising in the short run**

INVESTORS FOCUS on shares and bonds, but one asset class is bigger than the two combined. Put together, the world's homes are worth over $200trn. House prices are crucial harbingers of economic trends: the last time they fell across the rich world, it set off the deepest downturn in decades.

Ten years have passed since the Great Recession, and home values have made back most of their losses. In Canada and New Zealand they are 40% above the pre-crisis peak. Does another crash loom?

None of the main international institutions, such as the IMF or OECD, includes residential property in its standard battery of economic forecasts. That may be because home values depend on local factors. However, *The Economist* has kept a database of house prices for decades, using figures from the OECD and national agencies. And even an inexact forecast provides more insight than no forecast at all. As a result, we have designed a model to predict changes in real home values at the national level.

Our system relies on three types of data. First come economic figures such as GDP growth and interest rates. Next are market fundamentals, like the ratios of home prices to rents and incomes. Last come historical prices, to take into account momentum and mean reversion.

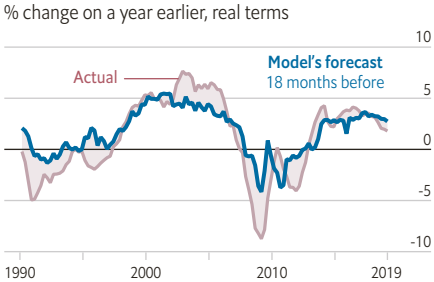
The impact of each of these variables often depends on the others. To combine them, we used a machine-learning algorithm called a random forest. This method creates a "forest" of "decision trees", each containing a series of yes/no choices such as "Has GDP been rising?" or "Are price-to-rent ratios below the long-run average?", and averages the output of each tree.

The model fares well in back-testing. On average, its forecasts with 18 months' lead time came within three percentage points of actual yearly price changes. These errors are larger during booms or busts—but still small enough for the model to be useful.

For example, in the year to March 2006 American house prices rose by 8%. Our model expected growth would slow to 0.3% in the year to September 2007. That was too sanguine: prices actually fell by 4.7%. But it still would have served as an early warning.

According to our model, conditions today are not similar to those of 2006. Across ten countries, the average of its median estimates for the year to June 2020 is an appreciation of 2.3%. The model does not rule out a downturn: there is a one-in-seven chance that Italian prices will fall by at least 5%. But the most likely scenario is that the rally has room left to run. ■

**Global house prices, forecast v actual***
% change on a year earlier, real terms




*Average of ten rich-world countries weighted by GDP

# The silent near-majority

**Republicans owe much of their success to liberals who don't vote**

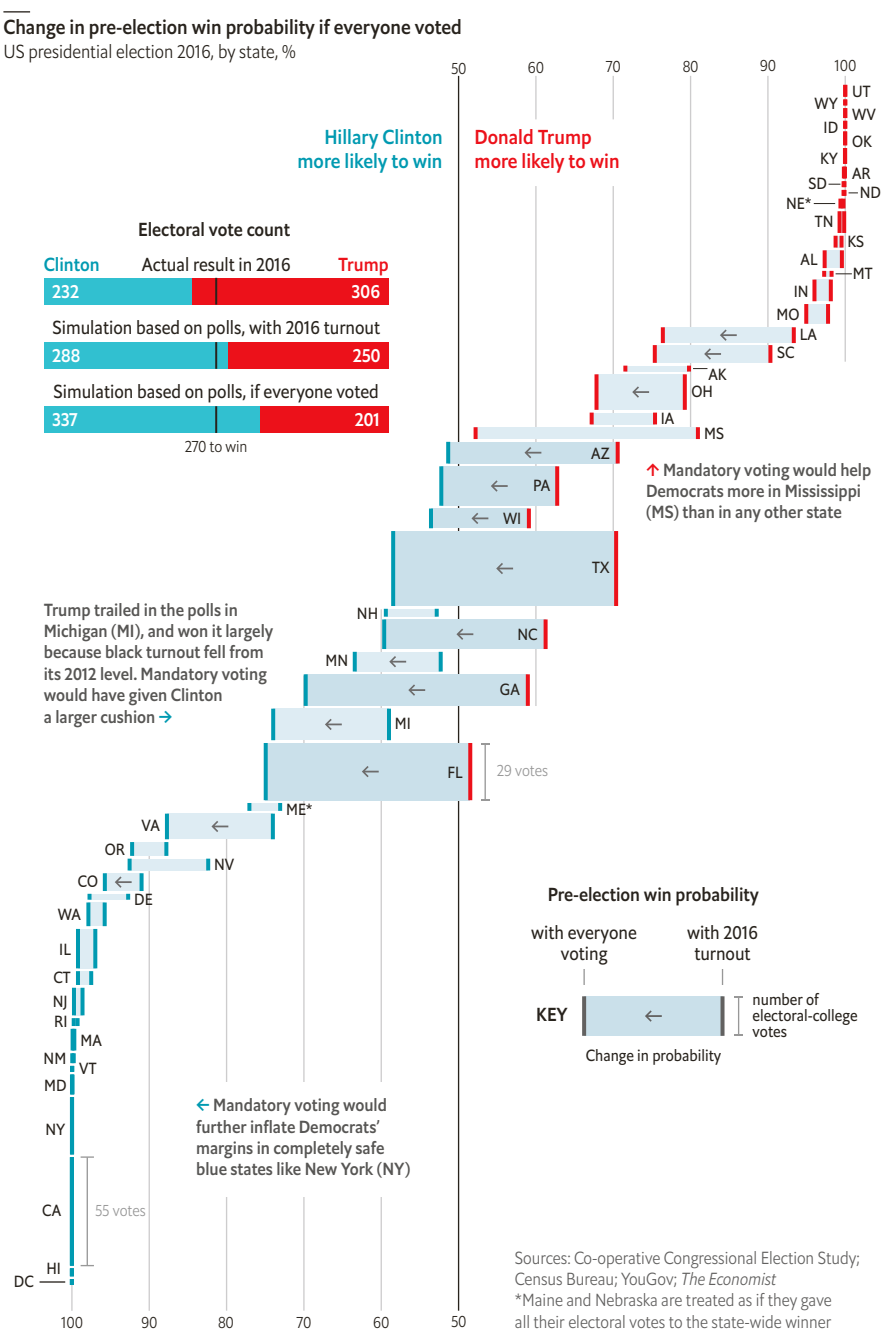
CLOSE OBSERVERS of America know that the rules of its democracy often favour Republicans. But the party's biggest advantage may be one that is rarely discussed: turnout is just 60%, low for a rich country. Polls show that non-voters—both people uninterested in voting and those blocked by legal or economic hurdles—mainly belong to groups that tend to back Democrats.

What would change if America became the 22nd country to make voting mandatory? To estimate non-voters' views, *The Economist* used the Co-operative Congressional Election Study (CCES), a 64,600-person poll led by Harvard University. The survey includes demographic data such as race and age, as well as participants' recollections of whom they voted for and verified records of whether they voted. In general, voters and non-voters from similar backgrounds had similar opinions. Using a method called "multilevel regression and post-stratification", the relationships between demography and vote choices can be used to project state-level election results—and to estimate what might have happened in the past under different rules.

Non-voters are relatively uneducated, young and non-white. The first of these traits predicts conservatism, but the others point to liberalism. If everyone voted, 30% of voters in the 21 most competitive states would not be white, up from the actual figure of 25%. As a result, in a typical cycle Democrats would add 50 electoral-college votes—enough to reverse the result in 2016.

If voting were universal, parties would not benefit from whipping their bases into a frenzy. Instead, they would need to court swing voters, pushing policies towards the centre. That centre, however, would sit to the left of its current position, putting the brunt of the adjustment on Republicans. ■

## If everyone in America had voted in 2016, Hillary Clinton would probably be president

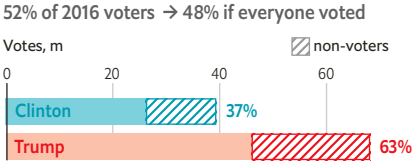



Sources: Co-operative Congressional Election Study; Census Bureau; YouGov; *The Economist*
*Maine and Nebraska are treated as if they gave all their electoral votes to the state-wide winner

## If America made voting mandatory, Republicans would have to adapt their message

### Whites without a college degree

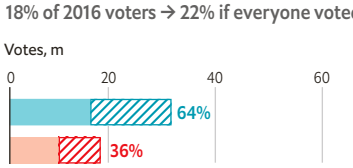
52% of 2016 voters → 48% if everyone voted




Universal turnout would make working-class whites less electorally important, but they would still make up 48% of voters. By focusing on culture-war issues like immigration, Republicans might expand their margin in this group—at the cost of alienating others.

### Young people (under 30)

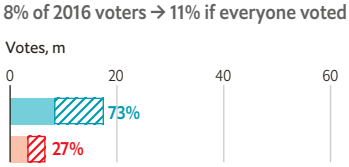
18% of 2016 voters → 22% if everyone voted




Adults under 30 turn out at low rates, but tend to lean left. If voting were universal, Democrats would win nearly twice as many new supporters as their rivals would. Republicans could try to shrink this gap by moderating their stance on, say, climate change.

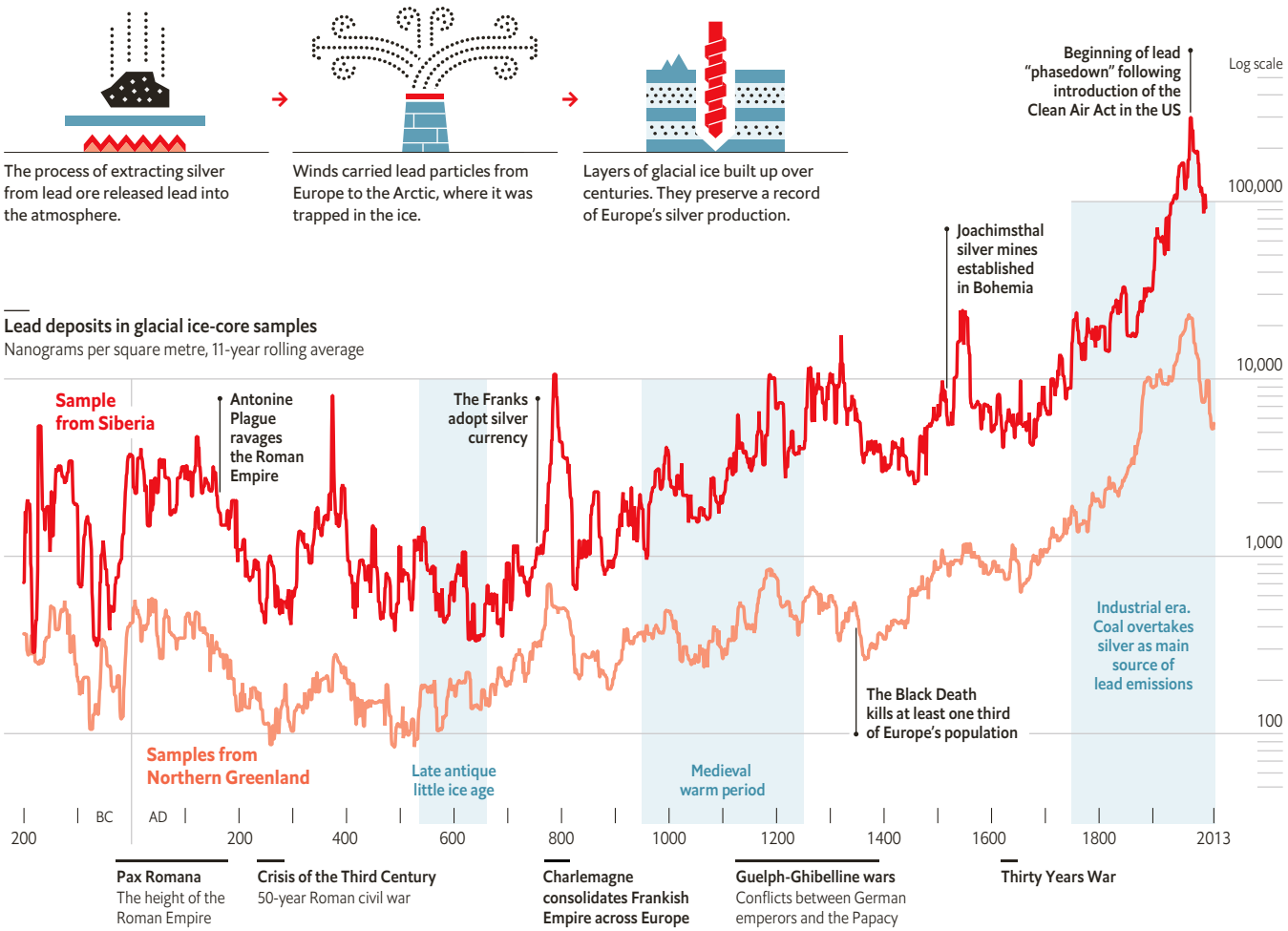
### Hispanics

8% of 2016 voters → 11% if everyone voted




Under universal voting, Hispanics' share of the electorate would rise sharply. Surprisingly, they do not list immigration among their ten most important issues. Republicans could court them most effectively by ending the campaign against Obamacare.

**Lead trapped in Arctic ice tracks Europe's money supply over the past two millennia**




Source: J. McConnell et al., *PNAS*, July 2019

# Plumbing the glaciers

**Arctic lead levels reveal the impact of climate and disease on Europe's history**

TODAY, JACHYMOV is a small Czech town nestling in a valley on the German border. In 1534, though, it was Joachimsthal, the largest city in Bohemia apart from Prague and home to the almighty thaler—a weighty silver coin that became the de facto currency of Europe and the New World. The thaler lent an English version of its name, "dollar", to the money of the United States and a score of other jurisdictions. Joachimsthal's silver rush began in 1512. By the middle of the century the local mines were the most prolific in Europe.

Joachimsthal's mines left another legacy, however: lead. Silver and lead often co-mineralise, and refining silver from its ore releases some of that lead into the atmosphere, where winds can carry it far and wide. Lead transported in this way to the Arctic often ends up trapped in layers of glacial ice. That is where a team of researchers led by Joseph McConnell of the Desert Research Institute, in Reno, Nevada found it, in ice cores pulled from glaciers in Greenland and Siberia.

In their new study, published in the *Proceedings of the National Academy of Sciences*, Dr McConnell's team used coring to analyse lead emissions and produce a record of the European economy from Roman to modern times. Moreover, by comparing records from Greenland and Siberia, Dr McConnell could distinguish mines in western and eastern Europe. Eastern mines left more lead in Siberia than in Greenland, and western ones the reverse.

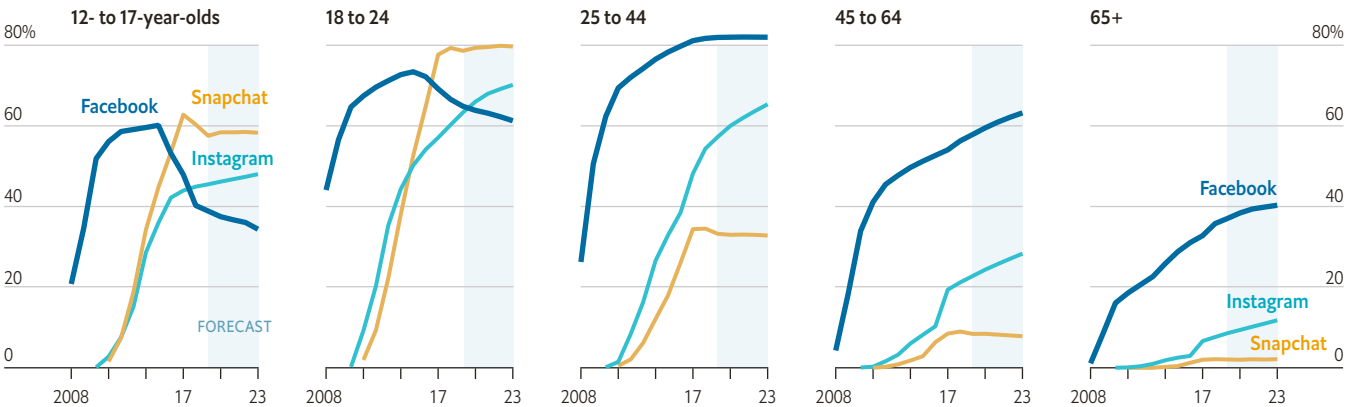
The data illuminate the historical record. As Charlemagne conquered most of western Europe, his mints turned out huge quantities of new silver currency. After his reign, his empire disintegrated and smaller potentates took over minting. Silver production rose gradually but steadily through the prosperous medieval warm period. Conflict punctuates the record, as combatants fought over mining regions.

Disease, too, makes its terrible impact plain. Major modern economic shocks, like the Great Depression, have taken a decade or so to recover from. By comparison, the Black Death halved lead levels, and it took 100 years for them to recover afterwards. The implication is that silver mines were unprofitable—either because of a lack of demand, or of a shortage of affordable labour, or both—well into the Renaissance. When plague recurred across Europe in the late 16th and 17th centuries, growth in lead emissions stalled as well.

After 1750, industrial processes overtook silver production as the chief source of lead pollution. Leaded gasoline, introduced in the 1930s, sent lead levels still higher. Starting in the 1970s, environmental policies in America and Europe decoupled lead pollution from economic growth. Arctic lead levels have since fallen by more than 80%—but they remain 60 times higher than in the medieval era. ■

**Teenagers are avoiding Facebook, as older users flock to it**

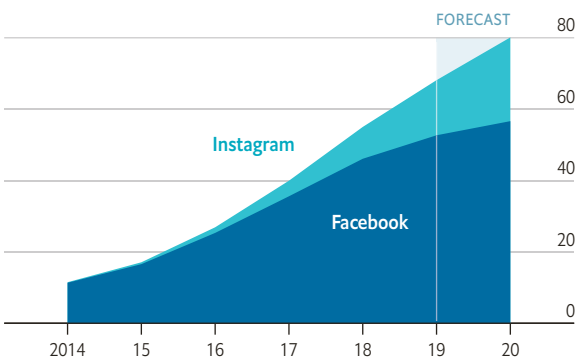
Share of Americans using platforms at least once per month, estimate, by age group




**Facebook's acquisitions of Instagram and WhatsApp have compensated for the greying of its core product**

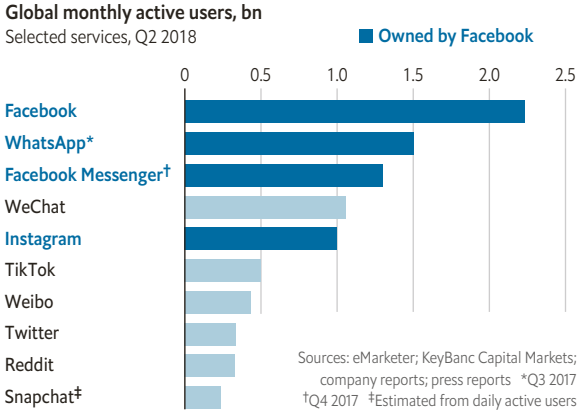
Advertising revenue, $bn

Estimate




Global monthly active users, bn

Selected services, Q2 2018




Sources: eMarketer; KeyBanc Capital Markets; company reports; press reports *Q3 2017 †Q4 2017 ‡Estimated from daily active users

# Teenage wasteland

**Youngsters are avoiding the Facebook app—but not the firm's other platforms**

IN 2003 MARK ZUCKERBERG built Facemash.com, a website ranking the attractiveness of his Harvard classmates. The college made him delete it. But the 19-year-old soon launched another site, on which users could create profiles and communicate. TheFacebook.com spread rapidly to other campuses. By 2006, when *The Economist* first wrote a story about the "student networking site", it had 10m users.

Today, Facebook's youth is a distant memory. Only four public companies are worth more than Mr Zuckerberg's. His dormitory invention boasts over 2bn users. Politicians and businesses use it to sway the public. Now that the social network has grown up, however, teenagers are increasingly avoiding it.

Measuring usage of Facebook is tricky: the firm says it stopped spammers from creating 2bn fake profiles in the first quarter of 2019. But eMarketer, a consultancy that blends Facebook's reported figures with polls, reckons that 16-year-old Americans are less likely to use it than 60-year-olds are. The share of people aged 12-17 who do so at least once per month has fallen from 60% in 2015 to 39% today. The figure for those aged 45-64 is 58%. A similar trend holds in other countries with reliable data.

One cause is youthful rebelliousness: few teens want to share a network with grandma. Another is the type of content the platform offers, explains Mark Mahaney of RBC, a bank. Whereas Snapchat and Instagram, two newer services, let teenagers document every moment with image filters and animated "stories", Facebook emphasises its news feed and messages. That is helpful for contacting old friends, but not for photographing breakfast.

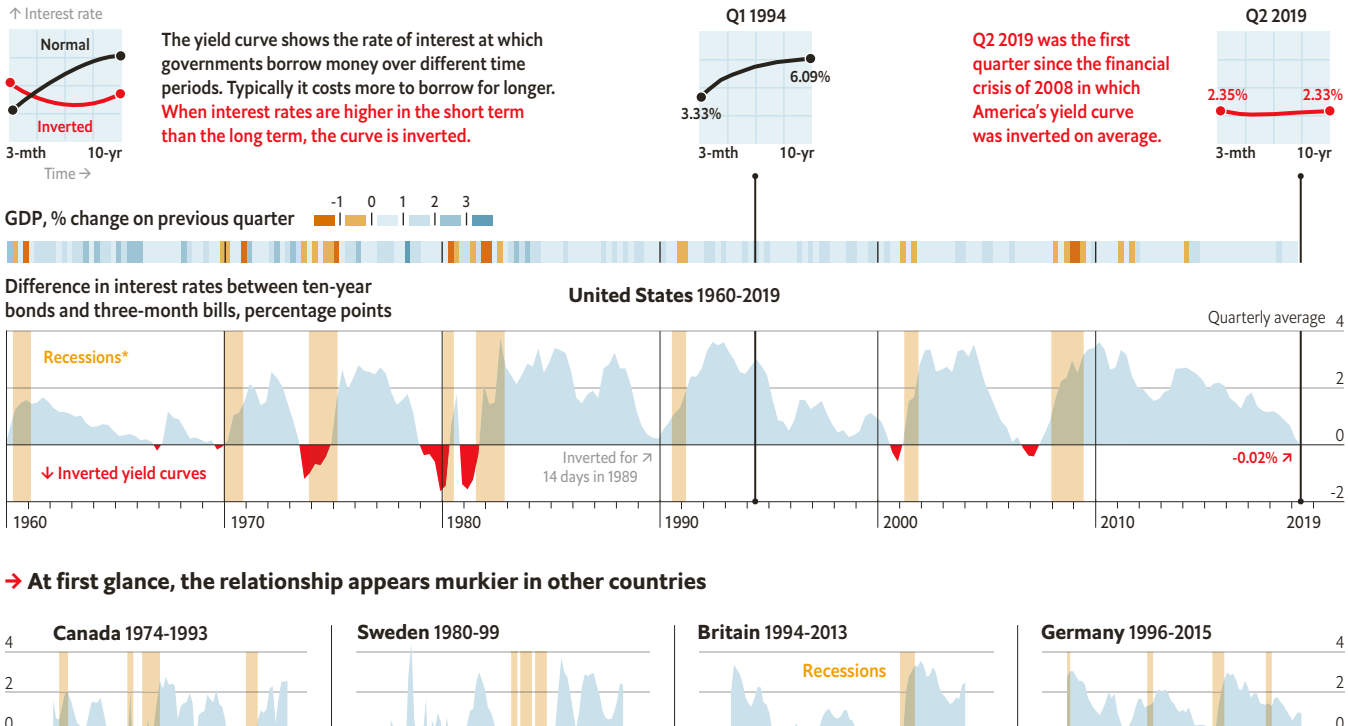
Luckily for Facebook, competition regulators permitted its acquisitions of Instagram in 2012 and WhatsApp, an instant-messaging app, in 2014. If one counts Facebook Messenger, a chat app the company carved out from its core site in 2011, Facebook now owns four of the five most used communication apps (excluding email).

Facebook does not break down its revenue by platform, but Andy Hargreaves of KeyBanc Capital Markets estimates that 23% of its $68bn turnover this year will come from Instagram, based on surveys of advertisers. That share will probably keep rising as Instagram offers more ad inventory in the stories format. WhatsApp will introduce ads in 2020—when Facebook plans to launch Libra, a digital currency.

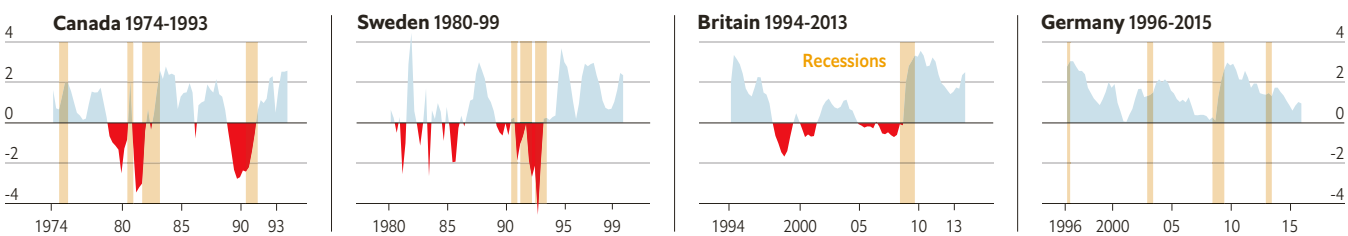
Facebook may soon receive a fine of around $5bn for leaking private data to Cambridge Analytica (see Business section), but can easily afford that sum. And however unfashionable the company's namesake platform is becoming, it is still adding more users.

Even if the Facebook site and app become moribund, Facebook the company is likely to remain competitive. Such resilience owes as much to regulators' past tolerance for a big incumbent gobbling up challengers as to the firm's deft strategy. ■

→ **In America, recessions typically follow after the yield curve has inverted**




→ **At first glance, the relationship appears murkier in other countries**




*National Bureau of Economic Research definition Sources: Datastream from Refinitiv; Haver Analytics; IMF; OECD; *The Economist*

# Curveball

**Yield curves help predict GDP growth across the rich world**

MANY ECONOMISTS see the link between GDP growth and yield curves as a curious case of American exceptionalism. In general, interest rates rise as borrowing periods get longer, because the risks of default and rising inflation grow over time. But occasionally this pattern reverses, and short-term rates exceed long-term ones.

In America, such "inversions" have foreshadowed economic turmoil. For all eight recessions since 1960, three-month interest rates exceeded ten-year ones on at least one day during the previous year. The signal has sounded just one false alarm.

There are good reasons why yield-curve inversions tend to precede recessions. At the short end, when central banks raise rates, the curve flattens and the economy slows. On the long side, when a recession looms, investors expect that central banks will cut rates to soften the blow. That lowers long-term yields, flattening the curve.

This logic should apply everywhere. Yet only in America has the curve been a soothsayer. In a dataset of 16 other rich countries, reaching as far back as 1960, 51 of the 95 recessions were not preceded by an inversion during the previous two years. Moreover, the curve seems prone to crying wolf. On 63 occasions, these non-American economies kept growing despite inverted yield curves.

The yield curve's failure to foresee recessions outside the United States has led some scholars to dismiss its predictive power as a fluke. With so few recessions in America, there is insufficient evidence to determine the strength of the relationship.

However, squashing yield curves and growth figures into a pair of binaries—inverted or not, and recession or not—leaves precious data on the cutting-room floor. A better test would check whether flattening curves foreshadow slowdowns, and steepening ones presage economic acceleration.

Seen through this lens, America is not an outlier. In 15 of 17 countries, changes in spreads correlated with changes in growth the next year. Overall, a one-percentage-point move in spreads predicted a 0.55-point change in growth in the same direction. The effect was strongest in Switzerland, at 1.1 points; America ranked third.

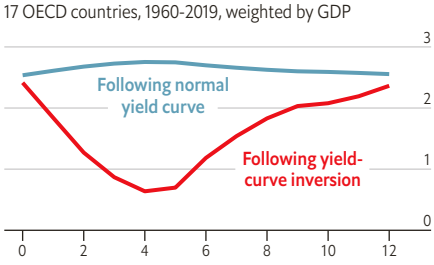
Economists do not appear to make full use of this well-known indicator. If they did, blending their predictions with yield-curve data would be no more accurate than using consensus projections alone. However, we found that consensus forecasts made a year in advance accounted for 57% of variance in GDP. In contrast, the blend explained 64%—a large improvement.

Changes in monetary-policy tools mean that the curve may lose some of its predictive power in future. Because central banks have bought long-dated bonds in quantitative-easing schemes, they now affect both sides of the yield curve directly. That makes long-term interest rates a less reliable proxy for market expectations.

But if history is any guide, America should expect a deceleration. Its curve has flattened by 1.1 points in the past year, implying growth will slow from 3% to 2%. ■

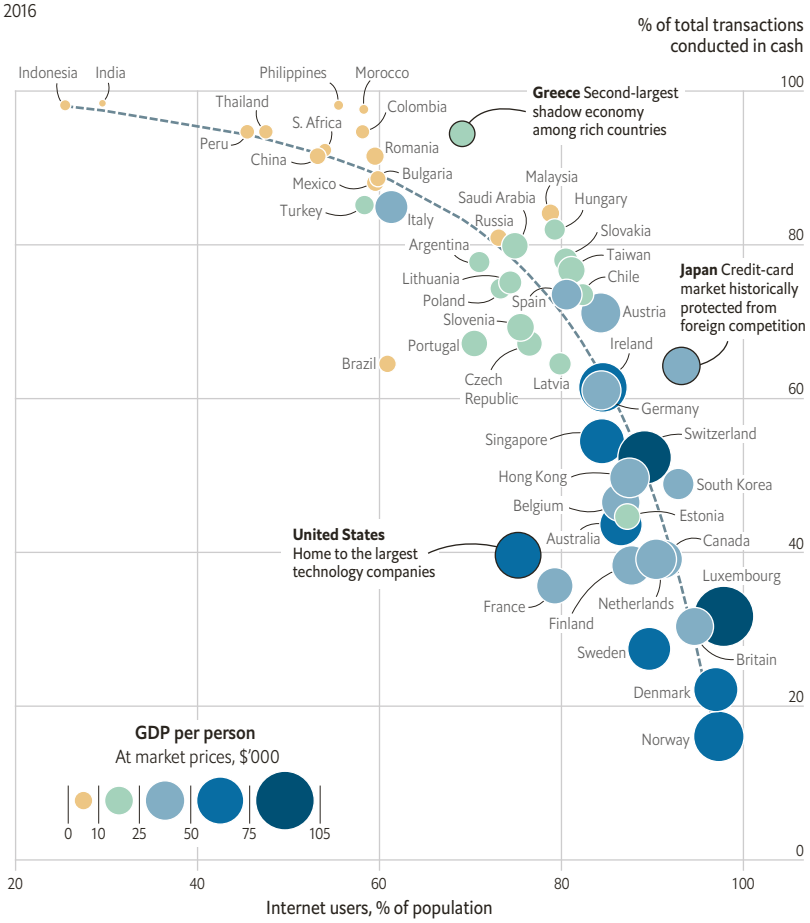
**Inversions are bad omens everywhere**

GDP, % change on a year earlier, average of 17 OECD countries, 1960-2019, weighted by GDP

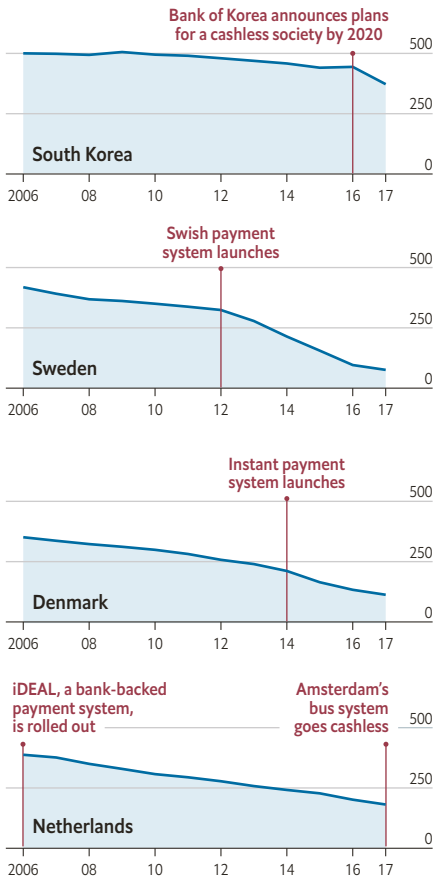


**More-digitised countries use less cash. Enthusiastic governments can speed things along**

Cash use v internet penetration
2016




Number of retail cash transactions per person




Sources: Bank of England; World Bank

# Tossing the coin

**Ditching cash requires high internet penetration and state support**

On July 27th, outside Brooklyn's hipper-than-thou Smorgasburg street-food market, a dozen hungry visitors stand idle amid the barbecue fumes. Rather than queuing for food, they are waiting at a cash machine. Yet inside the market, vendors are trying to wean their customers off cash. Gourmets who use Apple Pay, a mobile-payment service, receive hefty discounts on their purchases. "Apple pays us the difference," one trader explains.

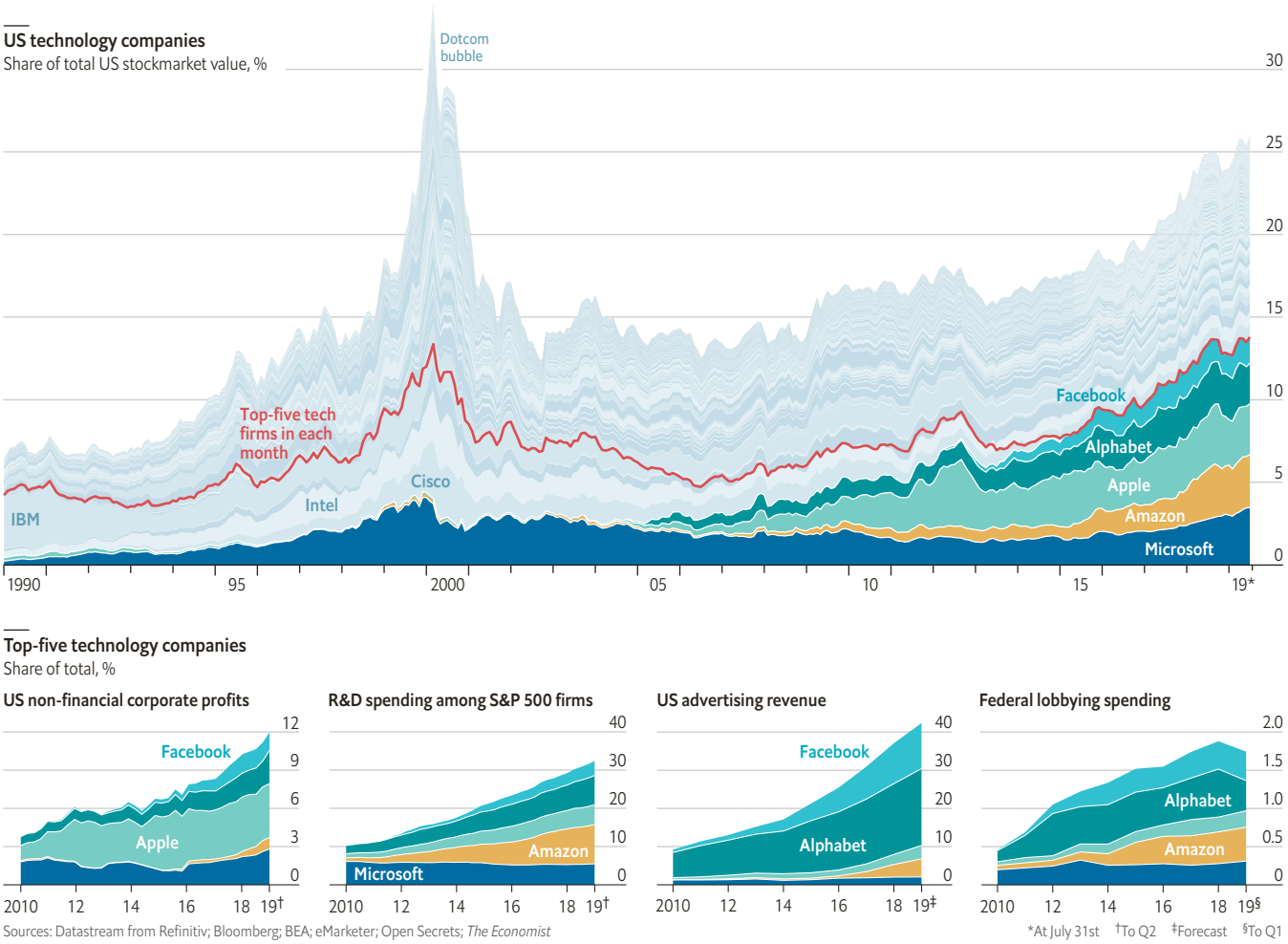
Most transactions around the world are still conducted in cash. However, its share is falling rapidly, from 89% in 2013 to 77% today. Despite the attention paid to mobile banking in emerging markets, it is rich countries, with high financial inclusion and small informal economies, that have led the trend. Within the rich world, more-digitised societies tend to make fewer cash payments. In Nordic countries like Norway and Denmark, where 97% of people use the internet, around four out of five transactions were already cashless by 2016, according to a recent review chaired by Huw van Steenis of the Bank of England. In contrast, internet penetration in Italy is just 61%, and 85% of transactions there were still handled in cash in 2016.

Beyond this broad pattern, decisions by both individual firms and governments have large effects. At the company level, installing infrastructure for contactless payments bears fast fruit. At Kearney, a consultancy, finds that in rich countries the number of transactions per card has risen by 20-30% within three years of contactless technology becoming widespread. Banks can accelerate the process by building fast, low-cost systems that enable direct transfers between accounts, such as iDEAL in the Netherlands or Swish in Sweden. America has ditched banknotes faster than its modest 75% internet-penetration rate would suggest because it is the domestic market of many large firms promoting digitisation, such as card networks (Visa, MasterCard), tech giants (Apple, Google) and payment apps (PayPal, Venmo).

Public policy also makes a difference. Some cities, such as London and Amsterdam, have banned on-board cash payments on public buses. Estonia—the birthplace of Skype, an internet-telephony app—has been a leader in digitising public services, such as filing taxes and voting. Its residents are comfortable using new technology and sharing data, and often snub cash. Japan, in contrast, uses more cash than its internet usage would indicate. Historically, it had a sleepy credit-card monopoly entrenched by regulation, which discouraged foreign firms from investing.

So far, cash has proved stubbornly difficult to stamp out completely. Even in Sweden, a front-runner, one in four transactions involves it. But a tipping-point may loom. Handling cash is expensive. Studies estimate its overall cost to society at 0.5% of GDP. As more payments become digital, this burden will fall on ever fewer stores, shoppers and banks. If cash-withdrawal fees rise to $10 a time, even technophobes and older shoppers may start paying for those truffle fries with their phones. ■

**Today's biggest tech firms have surpassed their predecessors' peak**




Sources: Datastream from Refinitiv; Bloomberg; BEA; eMarketer; Open Secrets; *The Economist*

*At July 31st †To Q2 ‡Forecast §To Q1

# Exalted valley

**America's technology giants look more entrenched than ever before**

THE TECH wobble of 2018 has turned out to be short-lived. In the final three months of last year, American technology shares dropped by 16%. Since then, however, the biggest firms, including Apple and Facebook, have come roaring back, with their stock prices today sitting near record highs. Meanwhile a parade of smaller digital companies have rushed to float their shares, including Uber and Slack. Airbnb could be next. All told, listed technology firms make up more than a quarter of the value of America's stockmarkets.

The last time tech companies were so important was back in 2000, when they were briefly worth a third of the value of all listed equities in America. Turmoil ensued soon after, with share prices in the sector falling by 66%. Compared with the dotcom bubble, the industry is more concentrated today: Microsoft, Amazon, Apple, Alphabet (Google's parent) and Facebook represent half of its market capitalisation. The prevailing concern is not that tech firms are too flimsy to justify their valuations, but that their position is too powerful.

The lofty prices for the big five rest on strong fundamentals. In 2010, they made 4% of the pre-tax profits of non-financial firms in America; that figure is now 12%. Their valuations imply that investors expect earnings to grow fast. They have good reason to be bullish, because today's giants are protected by high barriers to entry.

One element of this is that the big tech firms are spending heavily on innovation to try to ensure they remain at the cutting edge. In 2010 the big five tech companies accounted for 10% of the S&P 500's total spending on research and development. Today, their share is 30%.

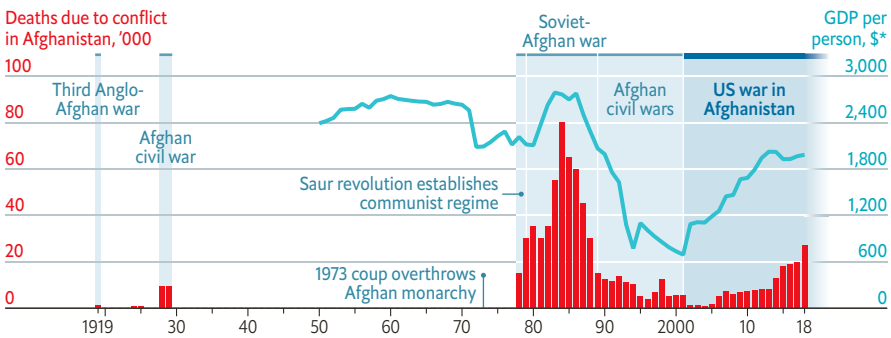
The big tech firms have also been keen to gobble up potential rivals. When Facebook was young, it rejected myriad acquisition offers, but it is now a predator, not prey, paying $19bn for WhatsApp in 2014. Since 2010, the big five have spent a net $100bn in cash (and more in stock) to buy would-be rivals. Partly as a result, the number of listed American firms worth at least $1bn that produce software or hardware has been flat since 2000.

The public has a love-hate relationship with big tech. Amazon delivers goods cheaply and makes only a slim margin. Studies suggest that many Americans would pay thousands of dollars a year rather than forfeit access to the digital services they get free. As a result, advertisers still throw mountains of money at tech firms in order to get access to their users. In 2019, one-third of the $240bn spent on advertising in America will be with two firms, Facebook and Google.

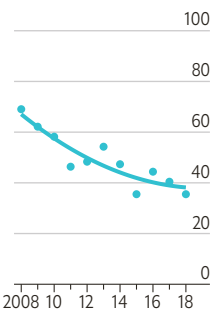
Nonetheless, the spectre of big tech firms abusing their troves of user data has sullied their image. In a new survey by Pew, a pollster, 33% of Americans say that tech companies have a negative effect on society, twice the share in 2015. In July the Department of Justice announced an antitrust review of the industry's leading firms. If you type "Should Google..." into the firm's own search bar, the first autocomplete response is "be broken up". ■

**A century after gaining independence, Afghanistan is more violent than it has been for decades**

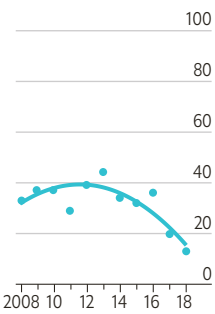
Timeline of Afghanistan's economic and military history




Afghans satisfied with personal freedoms, %

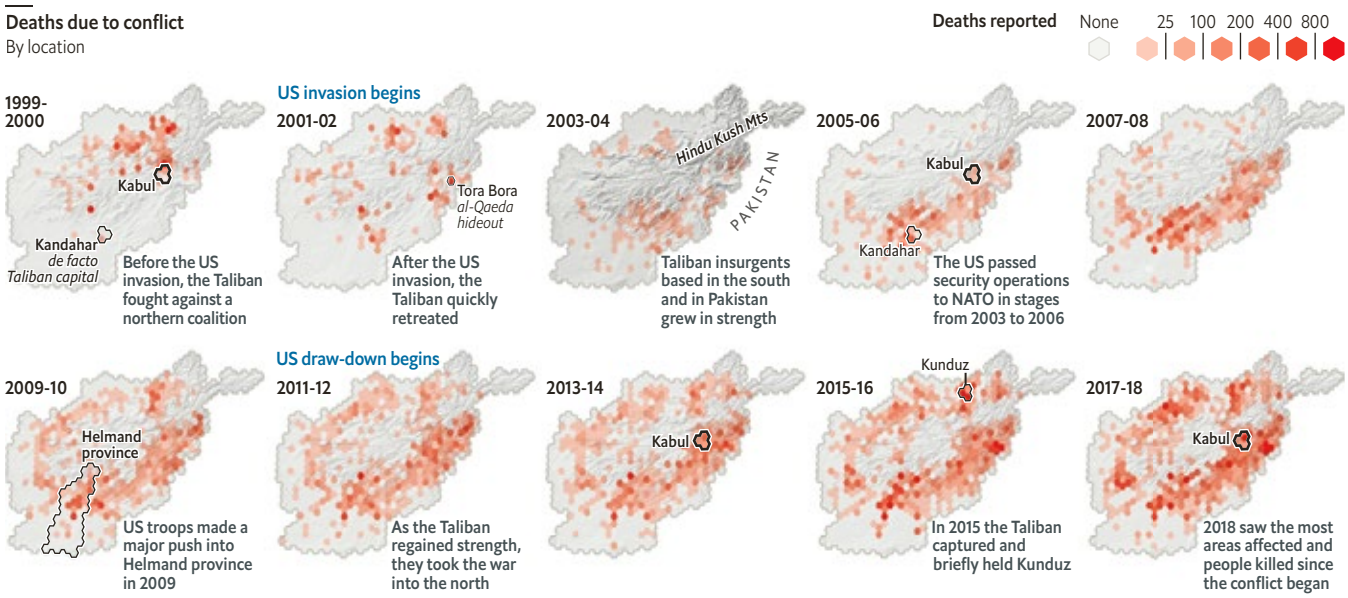



Afghans feeling safe walking alone at night, %




**The Taliban's insurgency has spread from strongholds in the south to the entire country**

Deaths due to conflict
By location




Sources: Gallup; Maddison Project; Peace Research Institute Oslo; Uppsala Conflict Data Program; World Bank

*2011 prices, at purchasing-power parity

# Prisoners of war

**Violence has not been this widespread since the Soviet withdrawal**

On August 19th Afghans will take to the streets to mark 100 years of independence from Britain. They have more to protest about than to celebrate: their country has not known peace for 40 years.

Afghanistan's modern woes began in earnest in 1979, when the Soviet Union invaded to prop up a communist regime. In response, America funded *mujahideen* rebels, escalating a bloody proxy war. The Soviet withdrawal in 1989 was followed by infighting among warlords, and then by the brutal rule of the Taliban, an Islamist group that took over much of the country.

After al-Qaeda plotted the September 11th, 2001 attacks from Afghan camps, the United States and its allies invaded. NATO-led troops have been stationed there since 2003. American negotiators and the Taliban have recently held talks about a peace deal, but the Afghan government has yet to participate formally (see Asia section).

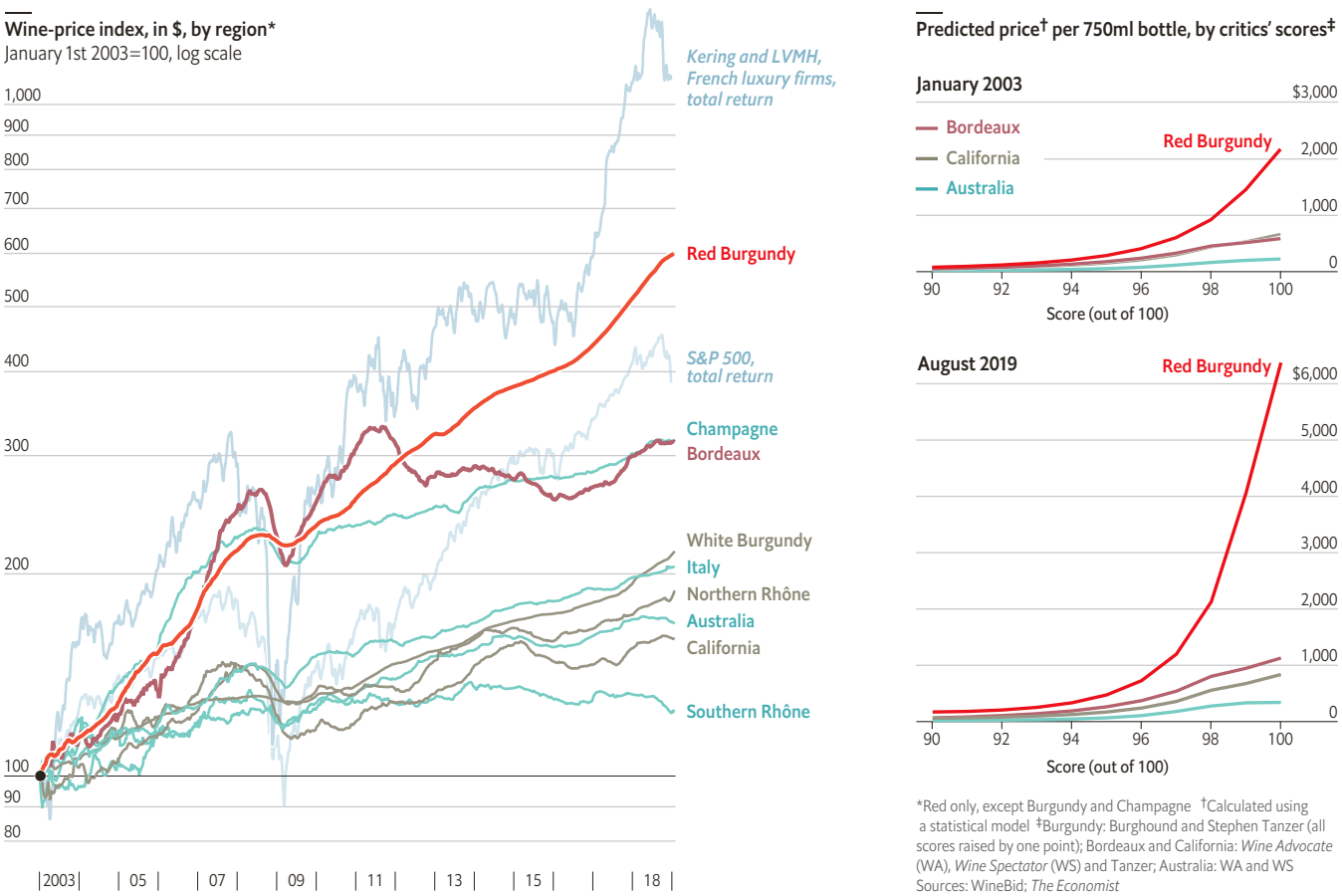
Westerners often assume that the war was fiercest in 2010, when the annual death toll for NATO forces peaked at 710. The coalition has pulled back since then, with the number of American troops falling from 100,000 to 14,000. As a result, just 94 NATO soldiers have died since the start of 2015. Donald Trump wants a full exit by 2020.

This hardly reflects a mission accomplished. Violence between Afghans has soared during NATO's retreat. In 2018 some 25,000 people were killed in the conflict—the most since at least the early 1990s, the earliest period in which detailed records based on contemporaneous reports are available. (Prior figures are estimated by historians, and are less reliable.) This toll is greater than the 20,000 or so who died last year in Syria, where violence has declined.

Facing less pressure from NATO, the Taliban are overwhelming the Afghan army, spreading to cities such as Kunduz from their stronghold in the south. A majority of Afghans now live in areas controlled or contested by the Taliban, according to the Long War Journal, a website that tracks the conflict. Gallup, which has polled Afghans since 2008, finds that record numbers fear for their liberty and safety.

The survivors are destitute. Historical economic records are patchy, but Bill Byrd of the United States Institute of Peace, a think-tank, describes a "lost quarter-century of development" after the Soviet invasion. The Maddison Project, which makes back-dated GDP estimates, suggests a deep recession in the 1990s. A recovery since 2001, aided by foreign spending, has sputtered. Afghanistan is the only country in Asia or the Middle East where people are still poorer than those alive in 1950 were. ■

**Red Burgundy is the only wine category whose returns have beaten the stockmarket since 2003**




*Red only, except Burgundy and Champagne †Calculated using a statistical model ‡Burgundy: Burghound and Stephen Tanzer (all scores raised by one point); Bordeaux and California: *Wine Advocate* (WA), *Wine Spectator* (WS) and Tanzer; Australia: WA and WS
Sources: WineBid; *The Economist*

# A cellar's market

**Want a top-performing liquid asset? Try Pinot Noir**

Wine collectors like to proclaim that "all roads lead to Burgundy." They often wince at the plonk they drank when starting their hobby. In America and Australia, a common entry point is local "fruit bombs": heavy, alcoholic wines that taste of plum or blackberry; bear the vanilla or mocha imprint of oak barrels; and should be drunk within a few years of bottling.

As oenophiles gain experience, they start seeking reds to have with, say, chicken as well as steak. That leads to lower-octane French options: Cabernet Sauvignon from Bordeaux rather than Napa; Rhône Syrah instead of Barossa Shiraz. But once you value complexity and finesse over power, your vinous destination is pre-ordained.

Encyclopaedic wine knowledge is most precious in Burgundy. The French region is split into hundreds of named vineyards. In turn, myriad producers own specific rows within each vineyard, from which they all make unique wines. This yields thousands of distinct pairings, each consisting of a few thousand bottles at most.

Moreover, red Burgundy is made from Pinot Noir, a grape with a maddening ageing pattern. After a few years of storage, it tends to "shut down" and lose flavour. The best wines blossom after a few decades, but many never "wake up" from their slumber.

In the past, Burgundy's complexity and small output relegated it to a market niche. A decade ago, Bordeaux—which makes fewer distinct wines in larger batches—became popular in Asia, and prices soared. But the bubble burst in 2012, when China's government began to frown on lavish gifts.

As tastes moved on from commoditised Bordeaux, mastery of Burgundy became seen as the test of connoisseurship, both in Asia and the West. But the region's vast array of wines—including trophies as scarce as 300 bottles a year—makes reliable pricing data hard to find. Among the hundreds of fine red Burgundies, Liv-ex, a marketplace, includes just 11 in its regional index.

To create a sturdier measure, WineBid, the biggest online wine auctioneer, kindly gave us a full sales record for every wine sold at least ten times on its site since 2003. The data contain 1.6m lots, covering 33,000 wines. We built portfolios of 50-500 of the most expensive unique labels (one vintage of one wine) from each region. We then estimated the returns for each portfolio, before storage and transaction costs.

Collectors who have drunk most of their Pinot already may need another glass after seeing the results. By the end of 2018, red Burgundy had returned 497%, versus 279% for the S&P 500. (Our index does not extend to 2019, since many of the wines it contains have not been traded this year.) The index has also been less volatile than stocks are, though this may be an artefact of how it is calculated: no one knows what each wine would have sold for in the crash of 2008-09. Bordeaux and Champagne rose by 214% in 2003-18; everywhere else did worse.

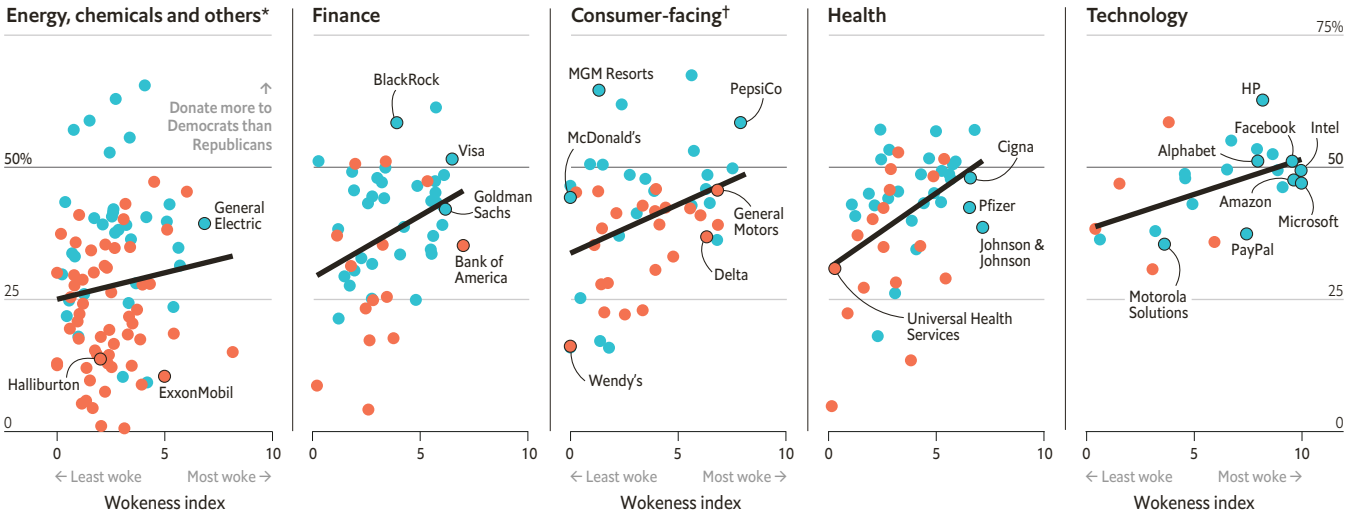
It is hard to fathom how Burgundy can maintain such appreciation. Many people can buy a $300 bottle. But at $3,000, the market depends on the whims of the rich.

Even if prices keep rising, the best-performing stocks tend to beat their vinous peers. For example, Kering and LVMH—luxury conglomerates whose owners have bought Burgundy vineyards—returned 958% in 2003-18. And with dividend yields over 2% in recent years, they have paid enough income for a *grand cru* bottle, too. The best way to make money in Burgundy is probably making wine, not buying it. ■

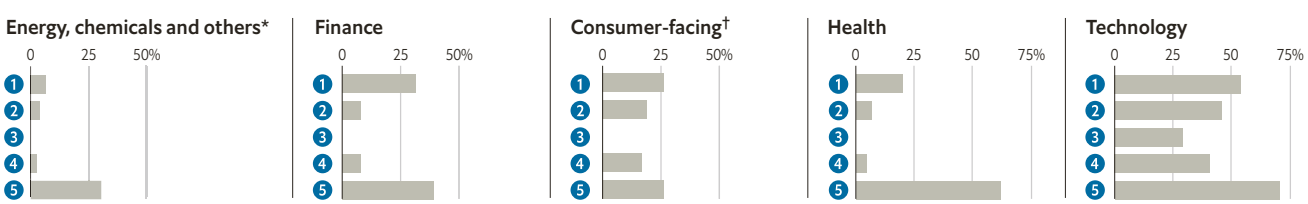
**Even socially liberal companies prefer Republicans—but not as much as their less "woke" peers do**

Wokeness index v share of donations given to Democratic candidates
By industry, 2018

Party that won presidential election of 2016 in company's home state: Democratic, Republican




Share of firms that meet the following wokeness-index criteria 1 Signed brief supporting same-sex marriage 2 Signed brief supporting transgender bathroom rights 3 Signed brief opposing Donald Trump's travel ban 4 Belong to group seeking to end the gender pay gap 5 Have employees who mostly donate to Democrats




Sources: Centre for Responsive Politics; JUST Capital; employersforpayequity.com; Federal Election Commission; SEC; *The Economist*
*Industrial goods, utilities, oil & gas, construction, aerospace & defence, chemicals †Household goods, transport, food, retail, entertainment

# Money where their mouths are

### Socially liberal firms really do give more money to Democrats

Captains of industry and social-justice warriors are strange bedfellows. Yet many American companies have embraced leftist causes. In 2016 PayPal cancelled its expansion in North Carolina after the state began limiting transgender people's choice of bathroom. When Donald Trump instituted a travel ban on people from Muslim countries, 164 firms signed legal briefs opposing it. And following a mass shooting in 2018 Delta, an airline, ended discounts for members of the National Rifle Association.

Sceptics of corporate social responsibility (CSR) say that such acts are mere marketing. Firms support reforms like laxer immigration laws out of their own financial interest; and supporting causes like gay rights costs them nothing. They still prefer conservative policies on their main concerns, often taxes and regulation.

Yet in a two-party system, firms cannot order a main dish of tax cuts with criminal-justice reform on the side. Democrats back social liberalism and tighter state control of corporations; Republicans espouse the opposite. Do supposedly socially tolerant companies donate more to leftists than to candidates on the business-friendly right?

To answer this question, we built a zero-to-ten "wokeness index" to measure the social progressivism of 278 firms. We give one point each for signing legal briefs in favour of gay marriage, or opposed to the Muslim ban or transgender bathroom restrictions. We grant another point for joining a group that seeks to end the gender pay gap and for having a workforce that gives at least 60% of personal donations to Democrats. The final five points are based on CSR scores from JUST Capital, a pressure group. The wokest companies, such as Microsoft, cluster in tech; the least woke are in oil and gas.

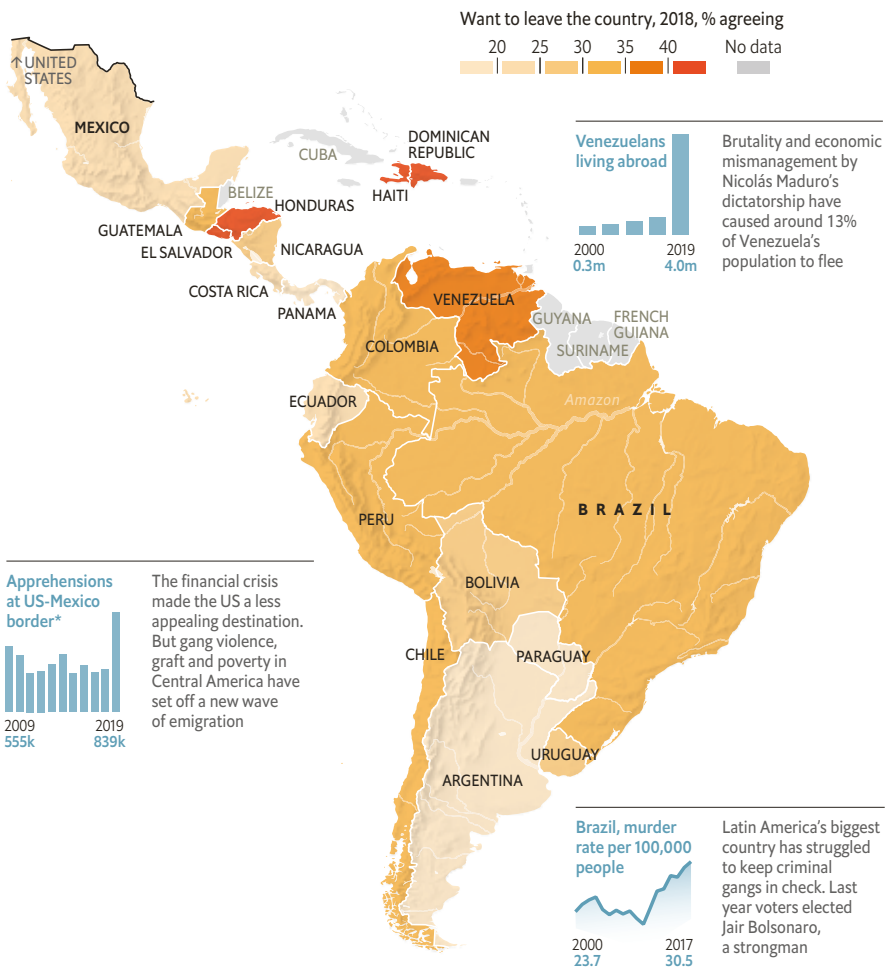
Armed with this index, as well as data on political donations from the Centre for Responsive Politics, a research group, we sought to measure whether woke firms practise what they preach. The results offer some support for each side of the debate.

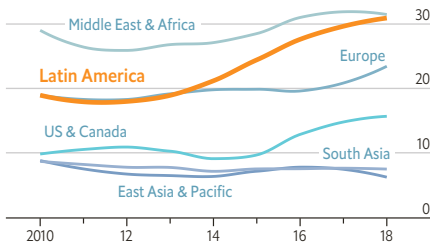
On one hand, wokeness clearly sways political-action committees. Using a statistical model, we found that if you took a group of companies in the same industry—which all gave $100,000, and were based in states that voted similarly in the presidential election of 2016—those with ten wokeness points would have given $12,000 more to Democrats than those with zero. (Companies tend to donate more to the party that is more popular in their home states.)

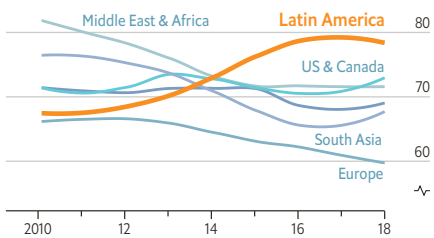
This effect varied by industry. The wokest health-care companies (such as Cigna, an insurer) gave Democrats half of their donations, compared with just a third for the least woke (like Universal Health Services, a hospital manager). The gap was smaller in industries affected by environmental regulation, such as chemicals. The wokest of these firms gave about 30% of their money to Democrats, and the least woke 25%.

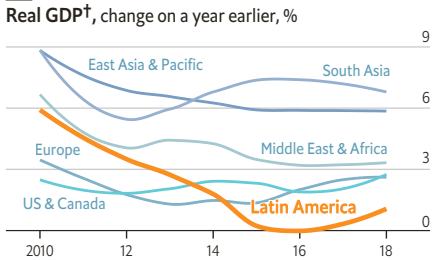
However, CSR sceptics will note that even the wokest companies give priority to profits. Firms in the top quarter of our index gave 58% of their money to Republicans. Liberals can denounce Alphabet, an advocate of gay marriage, for donating to politicians who oppose it. But if Google's parent company were less woke, it might have given even more to Republicans. ■

**Nearly a third of Latin Americans want to emigrate**




*In previous 12 months, to July †Weighted by population
Sources: Gallup; Latinobarómetro; IMF; World Bank; US Customs and Border Patrol; UNODC; IoM; UNHCR

# Continent of discontent

**Crime, weak economies and corruption make emigration look appealing**

When people vote with their feet, they usually make an informed choice. Venezuelans, for example, have many compelling reasons to leave Venezuela. Its government admits that it killed 5,287 people last year for "resistance to authority", inflation has reached as high as 2,700,000% and by early 2018 the average person had lost 11kg (24lb) from hunger. Perhaps 13% of the population have fled—over 4m people.

Citizens of El Salvador, Honduras and Guatemala are also emigrating en masse. They are fed up with poverty and violence, and people-smugglers have become adept at transporting them. This exodus is the main reason why in the past year officers at the United States' southern border have detained more people trying to cross than in any 12-month period since 2009.

Venezuela and Central America are uniquely troubled. However, their citizens' desire to get out is increasingly common. Gallup, a pollster, asks people in 120 countries each year if they want to emigrate. From 2010 to 2018 the share that said "yes" rose in 15 of the 19 Latin American nations it tracks. In 2010, 19% of people in the region hoped to move abroad permanently, the same as in Europe. Now 31% do, as many as in the Middle East and Africa.

Many are afraid of being killed. In Brazil murders hit a record high of 63,880 in 2017, following a resurgence of fighting between criminal gangs; the share of citizens who wish to emigrate has tripled to 33%. The country's homicide rate is now roughly level with Colombia's—where it fell as the government's war with the FARC guerrillas wound down, but could pick up again if some fighters' recent decision to abandon the peace accord of 2016 causes a return to war (see Americas section).

In countries where crime has not risen, economic doldrums have been the main driver of discontent. In 2010 Latin America's GDP grew by 6%, well above the global average. By 2016 it was shrinking, due to recessions in Brazil and Argentina—the latter of which imposed capital controls this week (see Finance section). In Mexico, the region's second-biggest country, the economy has plodded along with low productivity growth and little social mobility.

Another thing making Latin America less liveable is corruption. The region is grubbier than you would expect, given its relative affluence. In Brazil the Lava Jato investigation has exposed bribes paid by industrial firms to scores of politicians. Alan García, a former president of Peru, killed himself in April to avoid arrest in conjunction with the Brazilian scandal. According to Latinobarómetro, an annual survey, the share of Latin Americans dissatisfied with how democracy works in their country has risen from 52% in 2010 to 71% last year.

Latin Americans are not just voting with their feet; they are venting at the ballot box, too. In 2018 messianic populists who railed against corruption and crime won presidential elections in Brazil (the conservative Jair Bolsonaro) and Mexico (the leftist Andrés Manuel López Obrador). If voters remain this disenchanted, more leaders with autocratic streaks are likely to follow. ■

→ **Buyers of Austria's 100-year bond are betting on a century of rock-bottom interest rates**

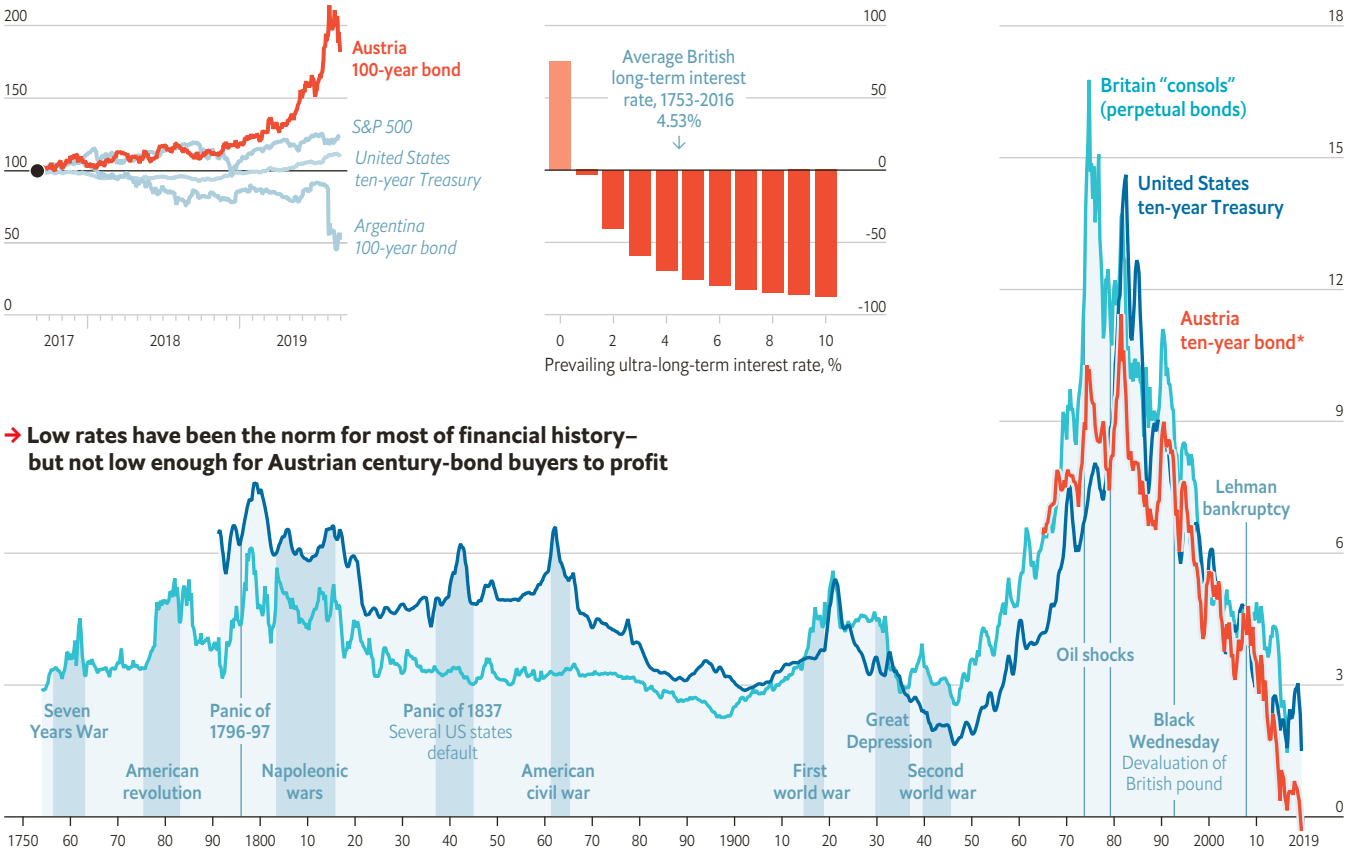
Austrian 100-year bond
Total return, September 13th 2017=100




Change in Austrian bond's net present value under interest-rate scenarios, %




Government bond interest rates, %




→ **Low rates have been the norm for most of financial history–but not low enough for Austrian century-bond buyers to profit**

*Mix of different terms prior to 1990 Sources: Datastream from Refinitiv; Bank of England; Federal Reserve Bank of St. Louis; Bloomberg; OECD; *The Economist*

# Austrian economics

**Century bonds are risky. Most buyers won't live long enough to regret it**

NO ASSET SHOULD be sleepier than the sovereign bonds of rich countries. In exchange for holding "risk-free" debt, investors accept low returns. In real terms, American ten-year Treasury bonds have returned just 1.9% a year since 1900, compared with 6.4% for shares. Since 2017, however, one bond issued by one rich country has returned a whopping 75%.

The country is Austria, and the coupon on the bond is just 2.1%. The secret to its success is its unusually long term. Lenders will not get their principal back until 2117, 100 years from the date of issue.

One of the main determinants of bond prices is the gap between their fixed coupons and prevailing market rates. If a bond is sold at a 4% yield and rates fall to 2%, its price will rise, since it produces twice the income that new securities do. This effect is modest for bonds near maturity. But over 100 years, this two-point gap is multiplied by 100 payment periods. As a result, ultra-long-dated debt is highly sensitive to jitters in interest rates. When rates dip, its price soars; when they surge, its value plunges.

In the past two years, the yield on Germany's ten-year bond has fallen from 0.4% to -0.6%. Rather than pay Germany to hold their money, some lenders have flocked to Austria's "century bond", which yields 0.9%. Long-term rates are now so low that America's treasury secretary has said the country may sell its own 100-year debt.

The bond's returns have drawn broad attention. For years, analysts thought that the floor for interest rates was 0%, because creditors would rather stash cash under mattresses than accept a negative rate. Now that negative rates prevail across Europe, this theory has been disproved. And the Austrian bond is the most potent tool to bet on a further decline in rates. If the ultra-long-term market rate fell by 1.1 percentage points, the bond's value would double.

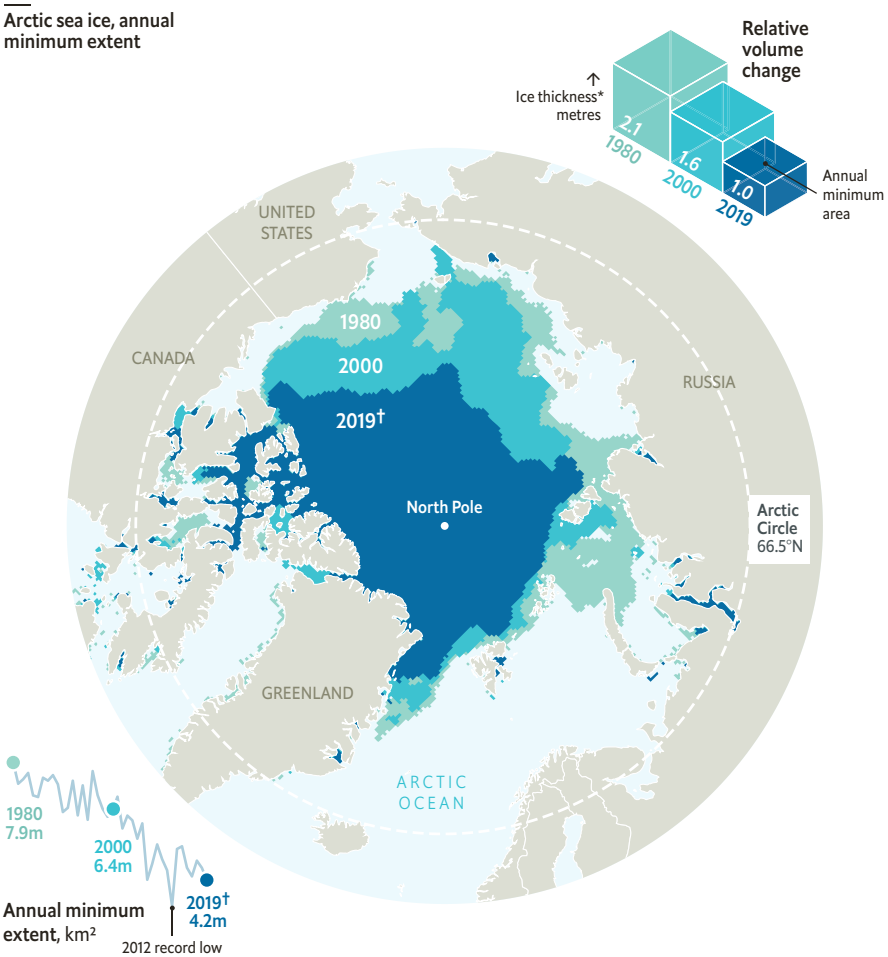
Rates may not have hit bottom just yet. In Europe economic growth is sluggish, and inflation has been tame. Germany's GDP shrank by 0.1% in the second quarter. As *The Economist* went to press, the European Central Bank was poised to cut rates, and possibly resume quantitative easing.

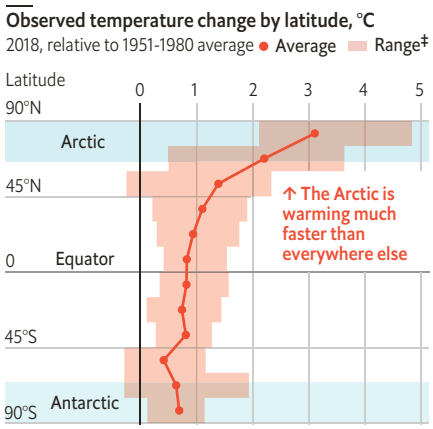
In the long term, demographic change weighs on interest rates. Longer lifespans and falling birth rates mean that Europe's population is ageing. This shrinks the workforce, slows GDP growth and reduces returns on capital—and thus bond yields.

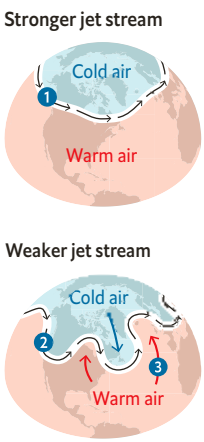
However, such trends may not hold up for ever. Nor can investors be sure of the survival of the euro, or of Austria's political stability. A century before the country issued its 2117 bond, the Austro-Hungarian emperor was facing defeat in the first world war. Argentina also sold a century bond in 2017; its price has fallen by 55%.

Moreover, the Austrian bond offers no room for error. Long-term rates have been low for most of history. In 1800-1950 Britain paid around 3.5%. But they have never settled below 1%, the level that today's investors need to profit. If ultra-long rates rise to 2%, the bond would lose 40% of its value; at 5%, its price would fall by 75%. Lenders seeking safety may face a rude surprise. ■

**The Arctic is the epicentre of global warming**




1 According to one theory, a big temperature difference yields a strong jet stream on a relatively straight path. This forms a barrier that keeps cold air in the Arctic

2 Smaller temperature differences produce a slower, wavier jet stream

3 Cold air moves south and warm air moves north. Weaker winds slow the movement of weather systems, causing heatwaves and cold snaps to linger

Sources: NSIDC; PIOMAS; NASA; *Carbon Brief* *Average for ice thicker than 15cm, 2019 data from August †Minimum at Sept 16th ‡1st-99th percentile of values within each latitude band

# Ice would suffice

**The consequences of a rapidly warming Arctic will be felt far afield**

AROUND 320BC, a Greek merchant called Pytheas set off for a long journey north. He brought back reports of a land called Thule, six days north of Scotland, "where... there are no nights during the [summer] solstice...and also no days during the winter solstice". It is unclear if Pytheas made it there himself, or merely heard tales. But for this and his account of a "congealed sea", he is said to have been one of the first Arctic explorers. Were he to return today, he would find a very different landscape.

Temperatures in the Arctic are warming twice as fast as the global average. One driver is the melting of floating sea ice. When it vanishes, it exposes deep blue waters, which absorb more solar energy than white ice does. In turn, this speeds up melting: a classic positive-feedback loop. The ice recedes to an annual minimum extent every September. The record low was set in 2012; 2007 and 2016 are joint second. This year is expected to be level with them.

The best-known consequence of Arctic heating is rising sea levels. Melting sea ice does not raise the water level, for the same reason that melting ice cubes do not make a cup overflow. However, water trapped on land in Greenland's ice cap does increase the sea level when it melts into the ocean.

Greenland has 2.85m cubic kilometres of ice, enough to lift sea levels seven metres. For now, it is melting slowly. Sea levels are rising by an average of 3.3mm per year; owing to an unusually hot summer in 2019, Greenland will contribute about 1mm.

Another feedback loop involves frozen soil. Normal garden soil consists of 5% carbon; soil in Arctic permafrost regions, rich in organic matter, contains 20-50%. It is thought to hold a total of 1.1-1.5trn tonnes of carbon, more than the atmosphere and ten times as much as the Amazon.

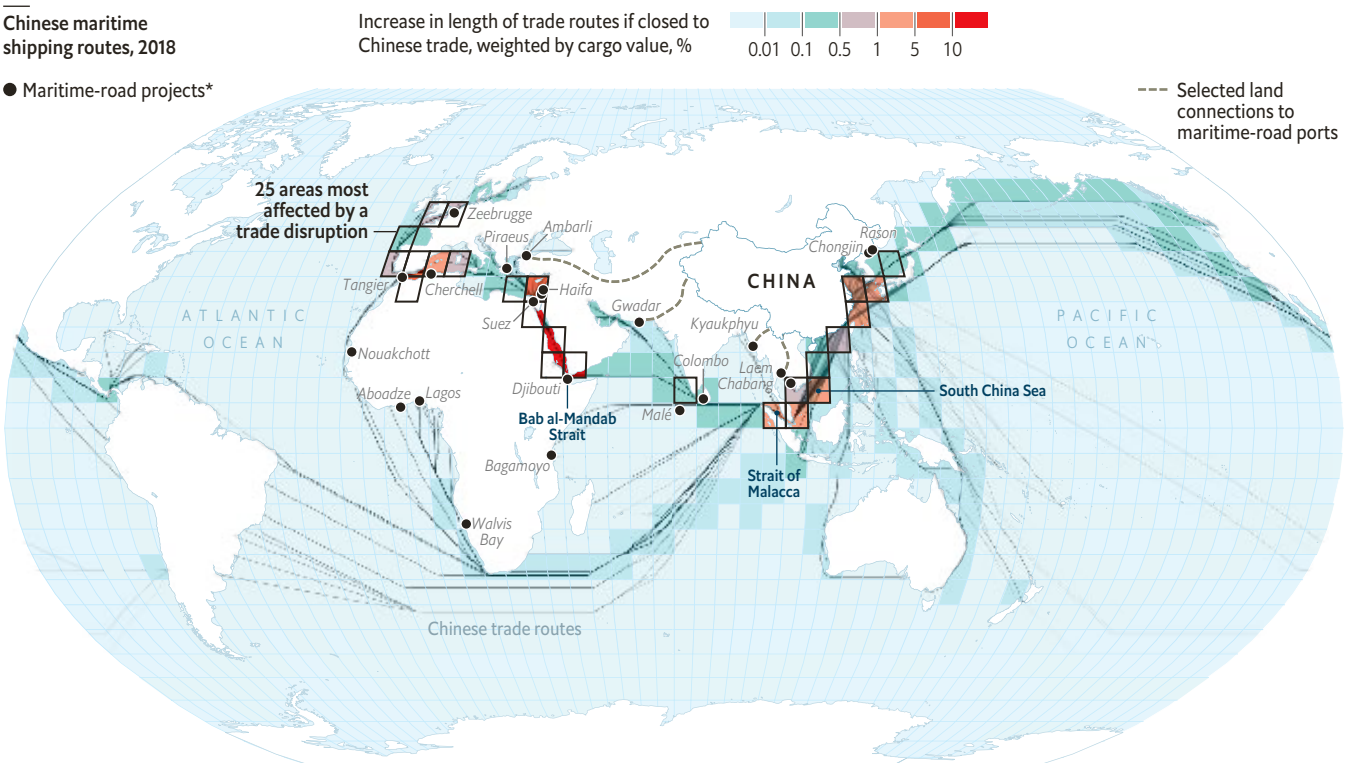
As the Arctic warms, bacteria in the soil consume organic matter faster, releasing more carbon dioxide and methane. These gases can then speed up the greenhouse effect—heating the permafrost further and causing more emissions. This July the Siberian tundra warmed and dried enough to catch fire for weeks, a very unusual event.

The third threat posed by Arctic warming is less scientifically certain but more immediate. Higher Arctic temperatures are thought to affect weather patterns in the northern mid-latitudes, where weather systems form as a result of the temperature gap between the hot tropics and cool pole. The jet stream pushes them west to east.

Some evidence suggests that as the temperature difference shrinks, the jet stream weakens and its wavy pattern deepens. This allows "tongues" of frigid air to reach south, and warm pockets to approach the Arctic Circle. It may also cause both storms and clear skies to stay in place for longer, leading to extended floods and dry spells.

Climate-change sceptics point to cold snaps in North America as evidence that concern about global warming is overheated. In fact such days, caused by chilly air escaping polar latitudes, may be a consequence of Arctic warming. ■

**China's maritime-road projects cluster where disruption to its trade would be most costly**




Sources: Mercator Institute for China Studies; World Bank; Journal of Contemporary China; European Space Agency; US National Centres for Environmental Information; NOAA Geosciences Lab/SOEST, University of Hawaii
*Where work is under way with a Chinese organisation that has a majority stake or is being tasked with development or operation

# The best offence is a good defence

### China's foreign port-building helps to protect existing trade routes

AN OLD SAYING warns about Greeks bearing gifts, but it might fit the Chinese better. In the 1400s Zheng He, a Muslim slave who became the Ming empire's admiral, led seven voyages south and west. He offered treasure to every leader he met—but only if they acknowledged the emperor, joining a world order centred on Beijing.

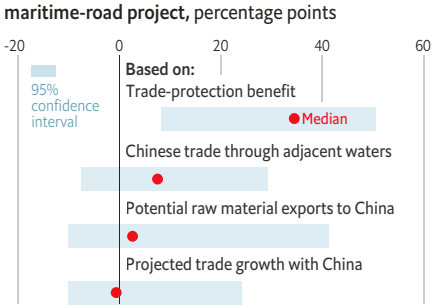
Chinese leaders today are following in Zheng's wake. The "road" half of its Belt and Road Initiative (BRI)—a global infrastructure-building scheme—is a maritime one of seaports and shipping channels. Xi Jinping, China's president, has said it will create a new model of "win-win co-operation". Some critics suspect nefarious motives, such as yoking poor countries to China by giving them unrepayable loans.

The BRI has evolved site by site and Chinese officials have not made their intentions clear. However, the locations of the 22 maritime-road projects that we have identified as under way show how it is most likely to aid China. They suggest it will be more useful for protecting existing trade routes than expanding Chinese influence.

To measure the maritime road's impact, we tested three benefits it could offer China. If the road were a resource grab, its projects should cluster in places that sell raw materials that China imports. If its aim were to boost trade, it should track the busiest routes used by Chinese shipping today, or where trade is likely to grow fastest. And if it were intended to secure current trade routes, its ports should sit near choke points—areas whose closure would force goods to travel circuitously—or in places that offer alternative routes.

We tested these explanations by using them to predict if countries host a BRI port.

**Change in probability that country has Chinese maritime-road project,** percentage points



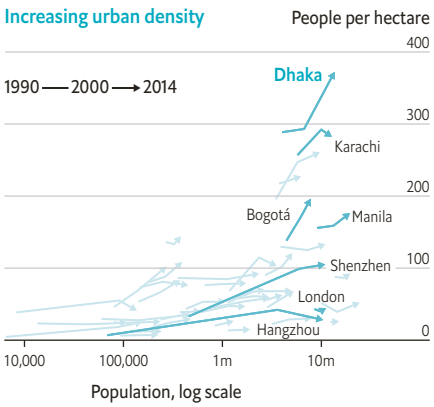

The results were conclusive. After holding other factors constant, there was no statistically significant link between having a BRI port and exporting raw materials that China wants, or having high current or projected trade with it. In contrast, the "trade-protection benefit"—either the value of Chinese trade in a country's waters multiplied by the extra distance goods would have to go if those routes were shut, or the amount of trade that would be diverted to a country if shipping were disrupted elsewhere—was a good predictor. Given two otherwise average countries, one with a high trade-protection benefit (like Libya) is 2.7 times likelier to host a BRI port than another with an average benefit (like Liberia).

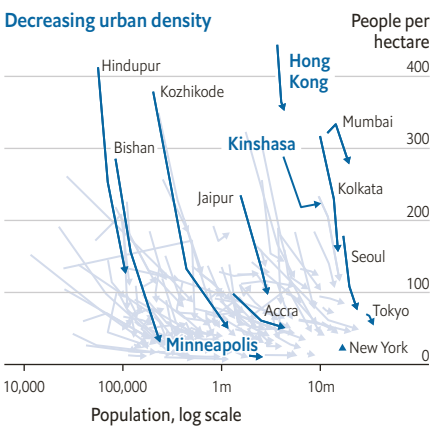
Owning or running a port does not guarantee perpetual access, but it does give China influence by enabling it to disrupt the host's own shipping if it chooses. Many overland "belt" routes in the BRI would also make Chinese trade more resilient. For example, if the Strait of Malacca were closed, China could switch to BRI ports it wants to build in Myanmar, and finish the trip on planned BRI rail lines.

China's military footprint also shows a focus on guarding trade routes. Its only base abroad is at Djibouti's Bab al-Mandab Strait—the waterway whose closure would hurt China more than anywhere else. ■

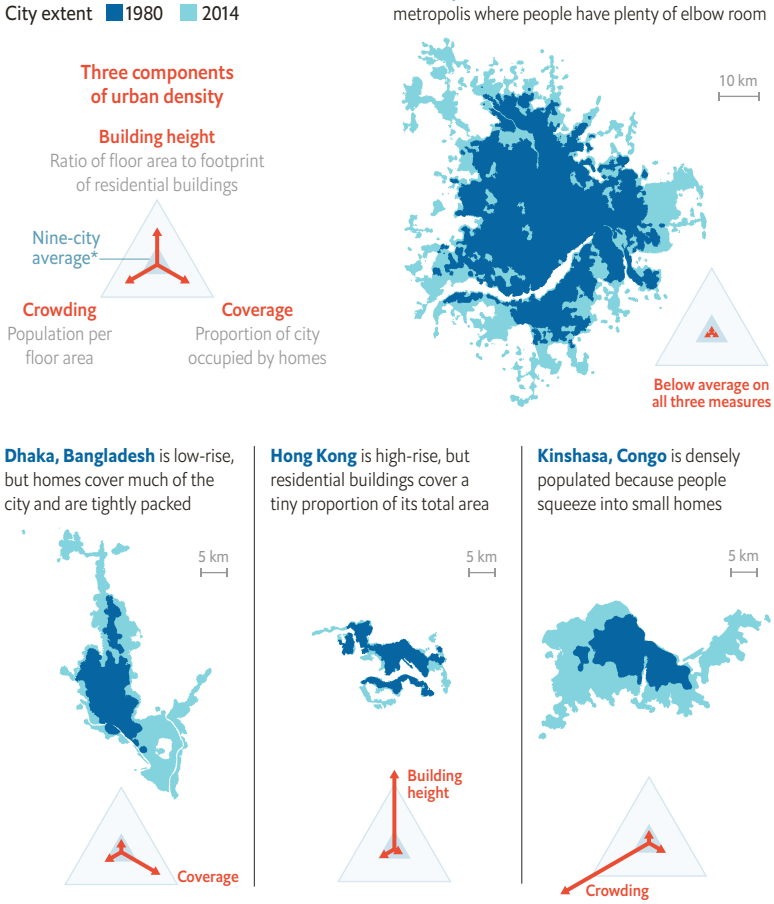
**Most cities are becoming less dense as their populations increase. The biggest engine of growth is sprawl, not building height**

Population v urban density, 1990-2014




How different cities grow




Sources: Atlas of Urban Expansion; "Anatomy of density I: six measurable factors that together constitute urban density (forthcoming)" by Shlomo Angel and Patrick Lamson-Hall (2019)
*Bangkok, Bogotá, Cairo, Dhaka, Hong Kong, Kinshasa, Madrid, Minneapolis-St Paul, Wuhan

# The paradox of density

**Modern cities add people by spreading out more than by building up**

Look up, and cities seem to be squeezing in more people. All of the world's 73 residential towers over 250 metres high were built after the year 2000. Another 64 are under construction. On 57th Street in New York, a building where *The Economist* used to have an office has been knocked down and replaced by an 82-storey glass splinter. When finished, it will be just 8 metres shorter than the Empire State Building.

But appearances can deceive. Shlomo Angel and researchers at the Urban Expansion Programme at New York University have used population data and satellite maps to show that most cities are becoming less densely populated. That is seldom because they are losing people (although New York is). Usually, it is because they grow faster in extent than in population. In 1990-2014, for example, Mexico City grew from 9.8m inhabitants to 17.8m, an 82% gain. During the same period, however, its built-up area expanded by 128%. This pattern is common. Sprawl has outpaced densification in 155 of the 200 cities tracked by the Urban Expansion Programme.

As people grow richer, they demand more space. Despite the efforts of many urban planners to stop them, they move from cramped inner cities to sparsely populated fringes (Mr Angel's team counts suburbs as parts of cities, regardless of where political boundaries lie). Moreover, because people are living longer and having fewer children, a growing proportion of households contain only one or two people.

Even the towers that spring up in city centres are not all that dense. There is a lot of air between them and a lot of elevator shafts inside them. High-rise cities like Seoul and Tokyo are less densely populated than Dhaka, the capital of Bangladesh, where most people live in walk-up apartment buildings or low-rise slums.

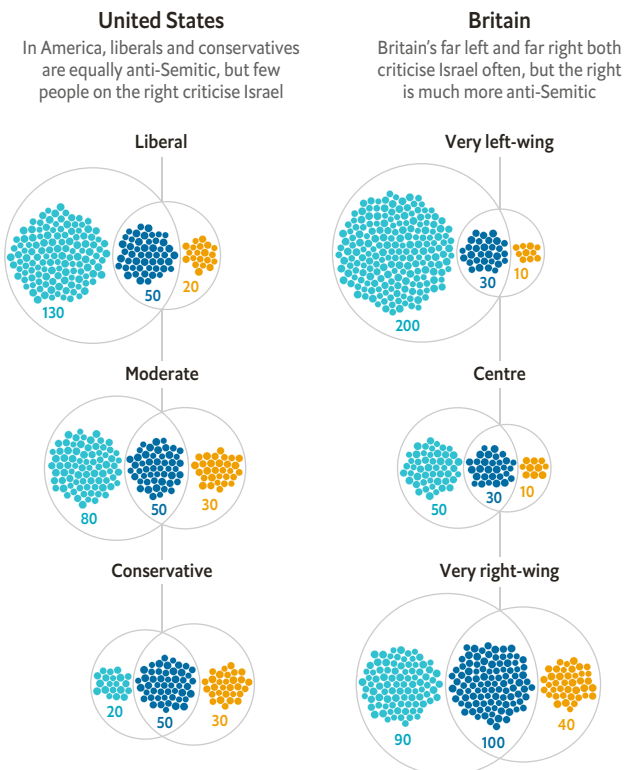
Cities can be dense in different ways. Hong Kong is a champion at stacking people on top of each other. But almost all of Hong Kong's built-up area is occupied by roads, pavements, offices, hotels, parks and mandatory spaces between buildings. The footprints of residential buildings account for less than 4% of it. In Dhaka, by contrast, homes cover nearly 20% of the land. In a poor city like Kinshasa, the capital of the Democratic Republic of Congo, population density comes mostly from squeezing more people into each room.

Many low-density cities wish to change. Minneapolis, for example, plans to alter housing codes to pack more people in. But density always comes with drawbacks. Towers cast shadows. Devoting more of the city to residential buildings means less space for other useful things—skimp on roads and you might end up with Dhaka's traffic jams. And nobody should envy the residents of Kinshasa. It is always worth asking the advocates of higher density: what kind, exactly, would you like? ■

**The link between anti-Semitic and anti-Israel views is closer on the right than on the left**

**Opinions on Jews and Israel**
For every 1,000 people from each group, by declared political ideology

● Highly anti-Semitic*
● Highly anti-Israel*
● Both




**Selected statements, % agreeing**
United States

Sources: YouGov poll of 1,500 Americans; "Antisemitism in contemporary Great Britain", by D. Staetsky, using Ipsos MORI poll of 5,466 Britons *At least 60% of maximum possible score

# Drawing the line

**Among critics of Israel, conservatives are most likely to be anti-Semitic**

One reason debate over Israel gets heated is that both sides question each other's motives. Supporters of Israel note that anti-Semites often cloak their prejudice in criticism of the Jewish state. They say some views—like saying that Israel should not exist—are by definition anti-Semitic. Pro-Palestinian advocates retort that charges of Jew-hatred are intended to silence them.

Such mistrust has grown in Britain and America, as anti-Semitism has resurfaced at both political extremes. On the left, legislators in America have accused pro-Israel colleagues of dual loyalty, and implied that Jewish money bought Republican support for Israel. In 2012 Jeremy Corbyn, now the leader of Britain's Labour Party, defended a mural depicting hook-nosed bankers.

The right has used similar innuendo, often by linking liberals to George Soros, a Jewish investor. Muddying matters more, Binyamin Netanyahu, Israel's prime minister, has also denounced Mr Soros. In America right-wing anti-Semitism also takes a more explicit, occasionally violent form. In 2017 marchers in Virginia chanted "Jews will not replace us." And in 2018 a shooter at a synagogue in Pittsburgh killed 11 people.

Can criticism of Israel be disentangled from anti-Semitism? Two recent polls in America and Britain that tried to do so reveal a pattern: hostility to Israel and to Jews are correlated, and the link is much stronger on the political right than on the left.

In 2016 Daniel Staetsky of the Institute for Jewish Policy Research, a think-tank, wrote a survey to distinguish these beliefs. It contained one series of statements about Israel as a country, and another about Jews as people. Ipsos MORI then polled Britons to see if they agreed with these views, and Mr Staetsky scored the respondents' hostility based on their answers. At our request, YouGov repeated the survey in America.

Few respondents expressed negative opinions of Jews. About 4% in Britain and 7% in America scored at least five out of eight on the anti-Semitism scale. Nonetheless, these rates imply that 2m Britons and 23m Americans are overtly anti-Semitic.

Moreover, anti-Israel and anti-Semitic beliefs were correlated. Americans with a mark of at least six out of nine on the anti-Israel scale scored 3.4 for anti-Semitism on average, compared with 0.7 for everyone else. In Britain the figures were 2.4 and 0.5.

But this effect's size changed with respondents' declared ideology. In America "liberal" foes of Israel had an average anti-Semitism mark of 2.3. For "conservatives" critical of Israel, it was 5.4. Among anti-Israel Britons, "very left-wing" people scored 1.6 for anti-Semitism on average, whereas "very right-wing" ones averaged 4.4.

The causes of this gap differ by country. In Britain lots of people at both ends of the political spectrum dislike Israel. But those who criticise Jews cluster on the far right.

In America, the left and right are equally anti-Semitic. However, American conservatives mostly support Israel. Many evangelical Christians see Israel's Jewish majority as fellow people of the book. And Republicans' hawkish foreign policy often aligns with Israeli positions. So in both countries, conservatives who do criticise Israel—a smaller share of America's right than Britain's—are often anti-Semitic, too.

None of this means that concern about left-wing anti-Semitism is overblown. The data simply show that most left-wingers who criticise Israel do not dislike Jews as people. Or if they do, they are embarrassed enough to hide their bias from pollsters. ■

# A sober brawl

### Alcohol firms promote moderate drinking, but it would ruin them

Of all the substances people intoxicate themselves with, alcohol is the least restricted and causes the most harm. Many illegal drugs are more dangerous to those who use them, but are relatively hard to obtain, which limits their impact. In contrast, alcohol is omnipresent, so far more people suffer from its adverse effects. In 2010 a group of drug experts scored the total harm in Britain caused by 20 common intoxicants and concluded that alcohol inflicted the greatest cost, mostly because of the damage it does to non-consumers such as the victims of drunk drivers.

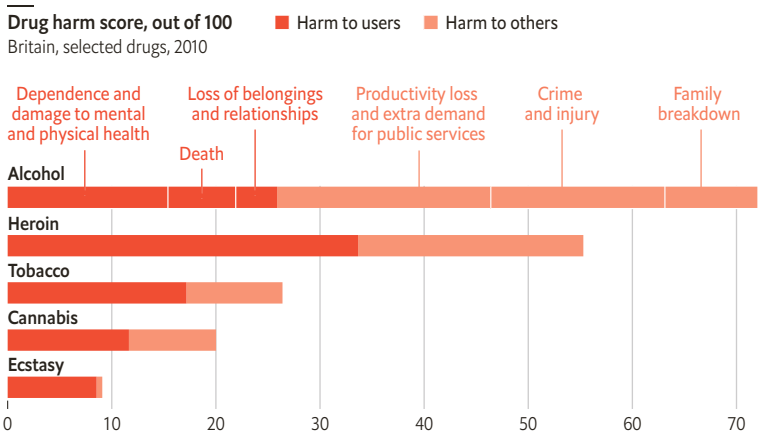
No Western country has banned alcohol since America repealed Prohibition in 1933. It is popular and easy to produce. Making it illegal enriches criminals and starts turf wars. In recent years governments have begun legalising other drugs. Instead, to limit the harm caused by alcohol, states have tried to dissuade people from drinking, using taxes, awareness campaigns and limits on where, when and to whom booze is sold.

The alcohol industry has pitched itself as part of the solution. In Britain more than 100 producers and retailers have signed a "responsibility deal" and promised to "help people to drink within guidelines", mostly by buying ads promoting moderation. However, if these campaigns were effective, they would ruin their sponsors' finances. According to researchers from the Institute of Alcohol Studies, a think-tank, and the University of Sheffield, some two-fifths of alcohol consumed in Britain is in excess of the recommended weekly maximum of 14 units (about one glass of wine per day). Industry executives say they want the public to "drink less, but drink better", meaning fewer, fancier tipples. But people would need to pay 22-98% more per drink to make up for the revenue loss that such a steep drop in consumption would cause.

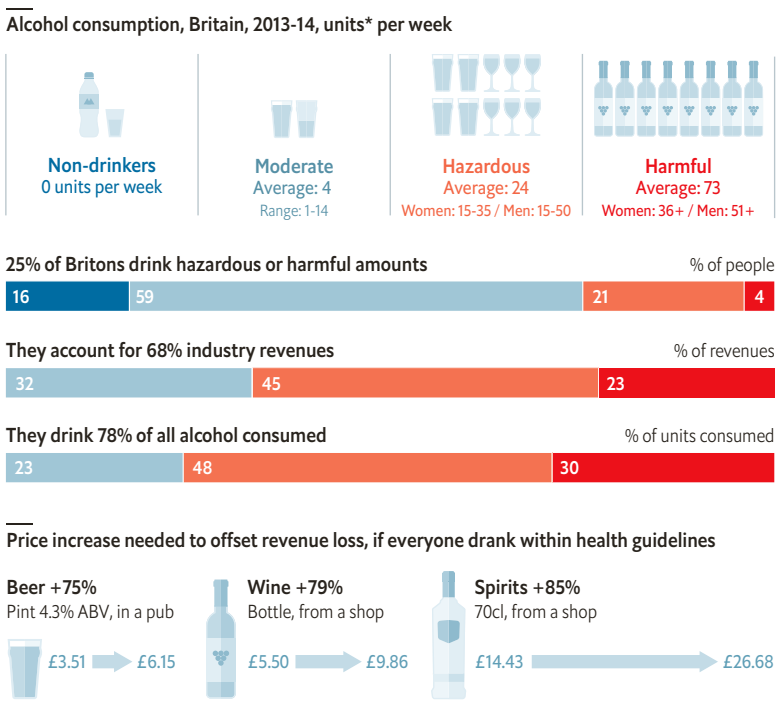
Health officials have taken note of such arithmetic. Some now wonder if Big Booze is sincere in its efforts to discourage boozing. In 2018 America's National Institutes of Health stopped a $100m study of moderate drinking, which was partly funded by alcohol firms, because its design was biased in their products' favour. And this year the World Health Organisation and England's public-health authority banned their staff from working with the industry.

Producers are ready to fend off regulators. In 1999 alcohol firms invested half as much on lobbying in America as tobacco firms did. Today they spend 31% more. ■

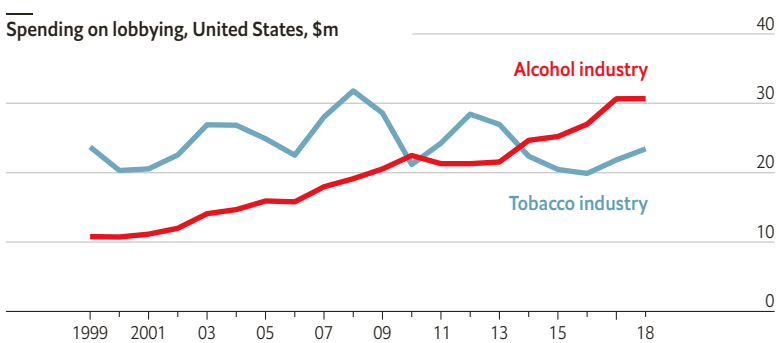
## → Because alcohol is omnipresent, it causes more harm than illegal drugs do




## → Alcohol firms depend financially on problem drinkers' dependency



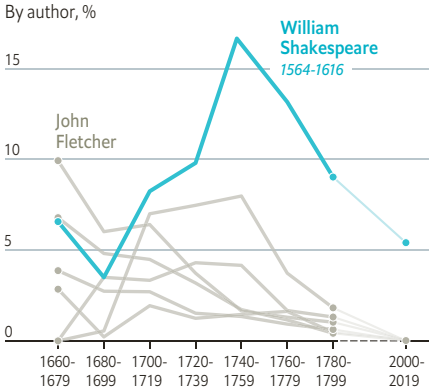

## → The alcohol industry now outspends tobacco on lobbying



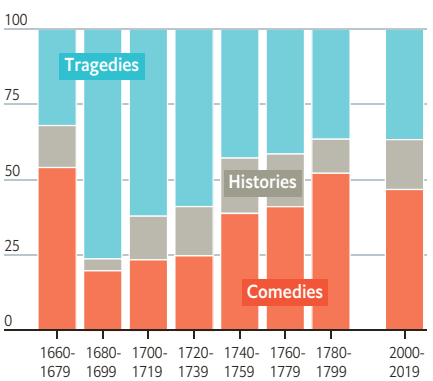

Sources: "Drug harms in the UK: a multicriteria decision analysis" by D. Nutt et al., The *Lancet*; "How dependent is the alcohol industry on heavy drinking in England?" by A. Bhattacharya et al., *Addiction*; Centre for Responsive Politics; NHS *8g of alcohol

**Shakespeare is as pre-eminent in London today as he was 200 years ago, but the city's favourite plays have changed**

Share of theatre events in London*
By author, %




Shakespearean performances by genre*, %




Past and present popularity of plays
Share of Shakespearean performances*, %

Sources: London Stage Database; UK Theatre Web *Includes adaptations by other authors

# Greatness thrust upon him

**William Shakespeare's reputation took a century to surpass those of his peers**

"He was not of an age, but for all time," wrote Ben Jonson, a peer of William Shakespeare's, in the preface to the First Folio—a collection of the bard's works published in 1623, seven years after he died. Today, those words seem prophetic. In Jonson's time, they were mostly just polite.

Shakespeare was popular in his day. His company drew large crowds at the Globe Theatre in London, and sometimes performed at court. But other authors of that era were more acclaimed. Francis Beaumont was buried in Poets' Corner at Westminster Abbey, near Geoffrey Chaucer. Jonson received a royal pension for writing. When Will died, few would have guessed that all the world would become his stage.

A newly digitised version of "The London Stage", a record of performances from 1660-1800, tracks Shakespeare's ascent to unquestioned supremacy. Mattie Burkert, the project's leader, says the data are patchy from 1660, when theatres reopened after a Puritan ban, to 1700, when daily newspapers began. Moreover, attributing shows to authors is tricky in the 17th century, since most were advertised without naming the playwright. Nonetheless, of 2,300 events recorded in this period, just 122 (5%) included material that might have been by Shakespeare. The data give more credits to two newer writers, John Fletcher (with 191) and John Dryden (137). Courtiers returning from France preferred libertine heroes and neo-classical styles. Shakespeare's untutored mingling of fools and kings seemed odd, so dramatists often rewrote his texts.

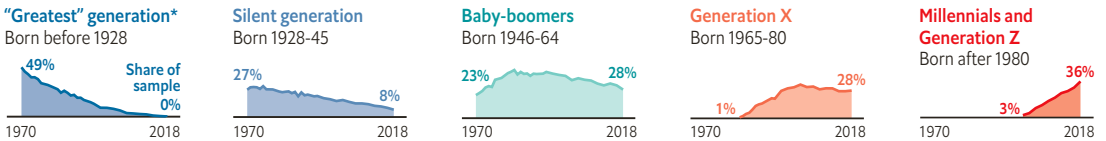
Shakespeare's star began to rise a century after his death. Fiona Ritchie, a scholar who specialises in his 18th-century reputation, notes a few causes. Some adaptations of his work, such as a happily ending "King Lear", became popular. In the 1730s the Shakespeare Ladies' Club, a group of aristocratic women, petitioned theatre owners to stage his plays rather than foreign operas. Comedies such as "Twelfth Night" and "As You Like It", now featuring female actresses, came back into fashion.

Even as the appetite for comedies grew, eminent actors—above all David Garrick—used sturdier roles, such as Richard III and Macbeth, to boost their careers. In 1769 Garrick organised a jubilee of Shakespeare's birth, to celebrate "the god of our idolatry". Shakespeare has held that status ever since. Harold Bloom, a critic who died on October 14th (see Obituary), called his plays "the outward limit of human achievement".

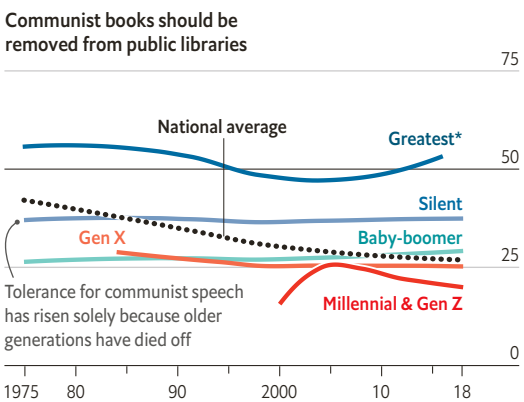
By 1800, 9% of shows in London used his material—down from a peak of 17%, but much more than his rivals. Today, Londoners still lend him their ears. Using listings from UK Theatre Web, an online archive, we estimate that the city's big theatres have put on 360,000 performances since 2000 (including musicals and operas to mimic the older data). Of those, Shakespeare accounts for some 19,000, or 5%. Although this share is similar to that of the 17th century, it is far more impressive, since Shakespeare must now compete with thousands of writers who had not been born in 1700.

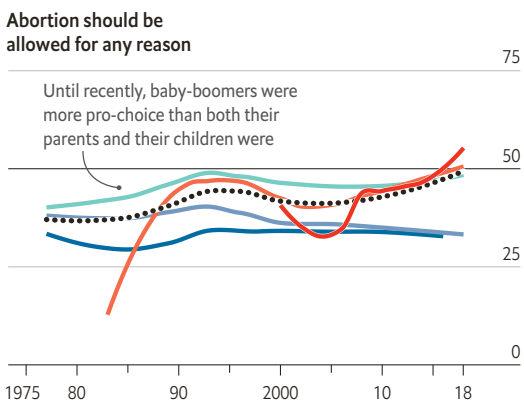
London's taste for specific plays has evolved. "A Midsummer Night's Dream", once seen as insipid, is now the most performed. But the split among comedies, tragedies and histories remains similar to that in 1740-1800. It was the thespians of that age who prepared him for all time. ■

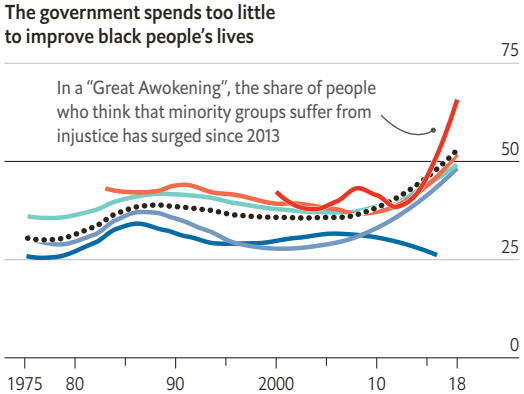
**On most issues, public opinion changes mainly as younger generations replace older ones**

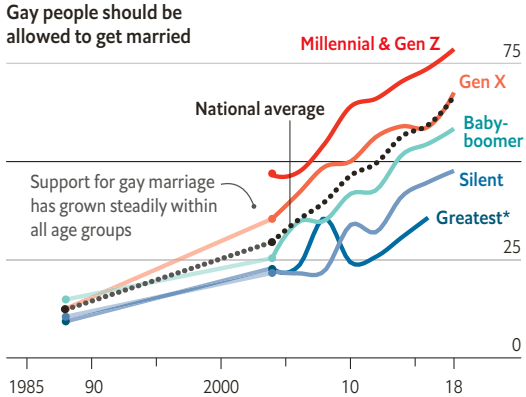


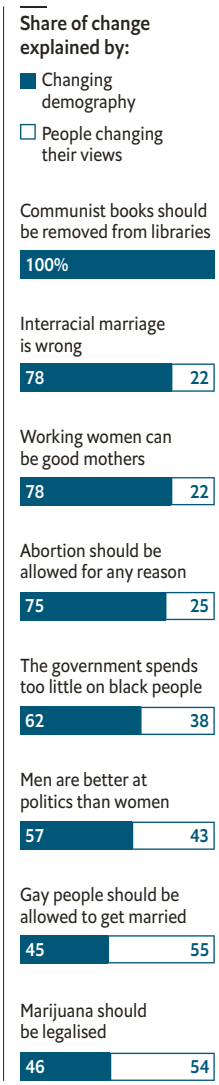

United States, % agreeing by generation




*And earlier Sources: General Social Survey; *The Economist*

# Talkin' 'bout my generation

### Societies change their minds faster than people do

As recently as the late 1980s, most Americans thought gay sex was not only immoral but also something that ought to be illegal. Yet by 2015, when the Supreme Court legalised same-sex marriage, there were only faint murmurs of protest. Today two-thirds of Americans support it, and even those who frown on it make no serious effort to criminalise it.

This surge in tolerance illustrates how fast public opinion can shift. The change occurred because two trends reinforced each other. First, many socially conservative old people have died, and their places in the polling samples have been taken by liberal millennials. In addition, people have changed their minds. Support for gay marriage has risen by some 30 percentage points within each generation since 2004, from 20% to 49% among those born in 1928-45 and from 45% to 78% among those born after 1980.

However, this shift in opinion makes gay marriage an exception among political issues. Since 1972 the University of Chicago has run a General Social Survey every year or two, which asks Americans their views on a wide range of topics. Over time, public opinion has grown more liberal. But this is mostly the result of generational replacement, not of changes of heart.

For example, in 1972, 42% of Americans said communist books should be banned from public libraries. Views varied widely by age: 55% of people born before 1928 (who were 45 or older at the time) supported a ban, compared with 37% of people aged 27-44 and just 25% of those 26 or younger. Today, only a quarter of Americans favour this policy. However, within each of these birth cohorts, views today are almost identical to those from 47 years ago. The change was caused entirely by the share of respondents born before 1928 falling from 49% to nil, and that of millennials—who were not born until at least 1981, and staunchly oppose such a ban—rising from zero to 36%.

Not every issue is as extreme as these two. But on six of the eight questions we examined—all save gay marriage and marijuana legalisation—demographic shifts accounted for a bigger share of overall movement in public opinion than changes in beliefs within cohorts. On average, their impact was about twice as large.

Social activists devote themselves to changing people's views, and sometimes succeed. In general, however, battles for hearts and minds are won by grinding attrition more often than by rapid conquest. ■

# Festival of darkness

**Smog tends to be worst in middle-income countries**

CITY-DWELLERS are used to dirty air, but few have seen a haze like the one enveloping Delhi this week. The concentration of PM2.5 (fine particles that settle in lungs) has exceeded 1,000 micrograms per cubic metre of air—100 times the limit the World Health Organisation suggests for long-run exposure. Inhaling this is as unhealthy as smoking 50 cigarettes a day. On November 1st the city closed schools and declared an emergency. It is letting cars only with odd- or even-numbered plates drive each day.

Such smog drifts over Delhi each November, after farmers burn the remnants of their rice crops to clear the land for wheat, and Hindus celebrate Diwali, a festival of lights, with a barrage of firecrackers. Even when the autumn haze subsides, air is filthy all over India—especially in the north, where the Himalayas act as a wind trap. AirVisual, a monitoring company, reckons that northern India contains 22 of the world's 30 most toxic cities. One academic study found that of the 9.7m Indians who died in 2017, 670,000 would not have perished if the atmosphere had been clean.

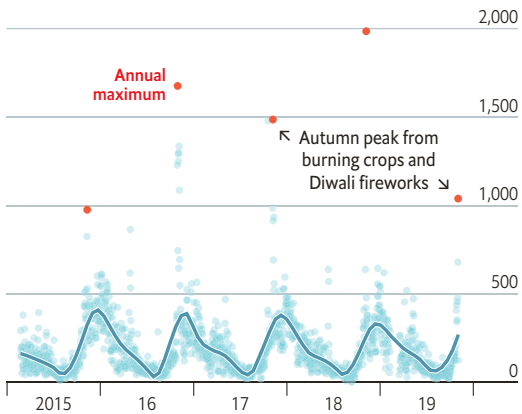
The response from Indian politicians has been piecemeal. Limiting cars will help only a bit, since 75% of the pollution does not come from vehicles. Judges have tried to restrict crop-burning and firecrackers, but local governments have not enforced their rulings. The health minister's contribution has been advising Delhi-ites to protect themselves by eating carrots.

These woes are grave but predictable. In general, as economies develop, pollution-related deaths rise at first, due to the growth of industry. Later, they fall, as countries get rich enough to afford clean production and their economies shift to services. According to Our World in Data, a website, deaths attributable to pollution peak in the middle-income range, at a GDP per person of $5,000-15,000 (adjusted for local costs of goods and services).

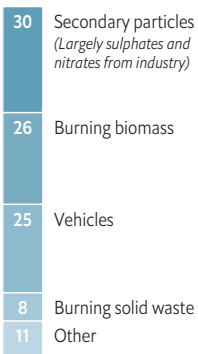
This suggests that India will eventually clean up its air. A few steps are within politicians' power now, such as enforcing court rulings, cutting subsidies for rice (which farmers over-produce) and discouraging the use of coal. Shortly after China reached India's current level of development, its death rate from air pollution began to fall. But achieving a rapid, nationwide transformation is perhaps easier for an authoritarian state with direct control over big companies than for a chaotic democracy. ■

## → Air pollution in Delhi spikes each November

**Delhi, daily air pollution**
Maximum reading*, $PM_{2.5}$ micrograms per cubic metre

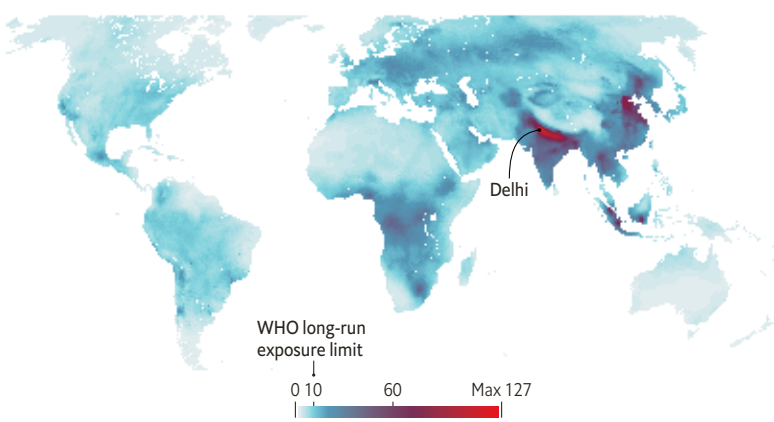



**Winter air pollution**
By source, %



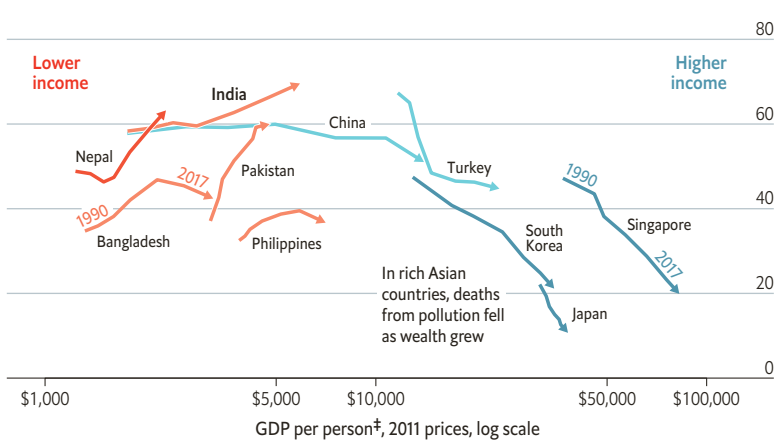

## → Smog in Asia is much worse than anywhere else

**Air pollution**
$PM_{2.5}$ micrograms per cubic metre, excluding dust and sea salt, 2016 average




## → Economic growth leads first to a rise in deaths from pollution, then a fall

**Excess deaths per 100,000 population attributed to air pollution† v GDP per person**
1990-2017

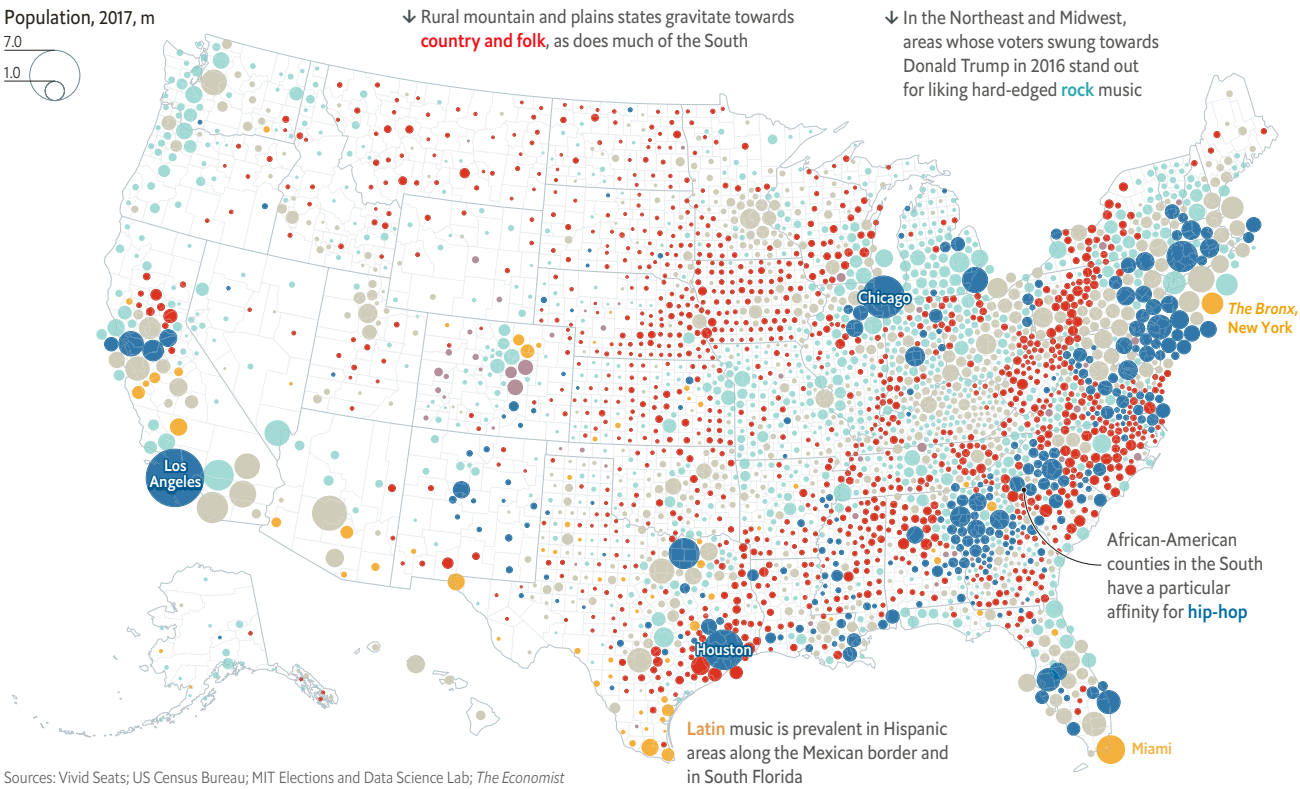



Sources: United States Environmental Protection Agency; Indian Institute of Technology Kanpur; Centre for International Earth Science Information Network; Institute for Health Metrics and Evaluation; World Bank
*At American embassy †From ambient particles in atmosphere ‡ At purchasing-power parity

**Musical preferences mirror America's demographic and political divides**

Most popular genre relative to national average, by county, share of live music tickets sold, 2019, %

● Country/folk ● Hip-hop/rap/R&B ● Rock/alternative ● Pop ● Latin ● Dance/electronica




Sources: Vivid Seats; US Census Bureau; MIT Elections and Data Science Lab; *The Economist*

# Playlists and politics

### The ballad of the Obama-Trump voter is likely to feature screeching guitars

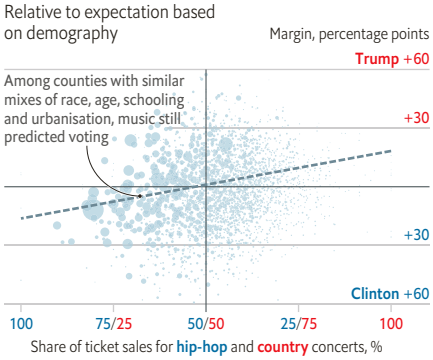
One reason America has become so polarised is that its two big parties are increasingly seen to represent tribes as well as policies. One study by Lilliana Mason of the University of Maryland found that whether people said they were "liberal" was a better predictor of reluctance to marry a "conservative"—and vice versa—than actual views on political issues were. Another paper, by Douglas Ahler of Florida State University and Gaurav Sood, found that Americans wildly exaggerate the share of each party's voters made up by certain groups. On average, poll respondents guessed that 32% of Democrats were gay and that 38% of Republicans earned over $250,000. The real figures were 6% and 2%.

Ample evidence shows that the two sides differ on more than just taxes and guns. One viral quiz in 2014 predicted party loyalty using quirky data: Republicans were more likely than Democrats to prefer dogs to cats, neat desks to messy ones, action films to documentaries and Internet Explorer to Google Chrome. Using data on concert tickets from Vivid Seats, an online market, we find that tastes in live music also mirror America's political divide.

Regional variation in musical preferences is tied to demography. Hip-hop, a genre invented by urban blacks, is most popular in cities and in African-American areas. Sales for Latin styles like merengue are high in Hispanic counties in Florida and near the Mexican border. Country and folk, full of odes to wide-open spaces, prevail in plains and mountain states. Yet playlists also provide extra information about political beliefs, beyond their ability to stand in for race and population density.

**Musical genre preference and vote share in 2016**

Relative to expectation based on demography

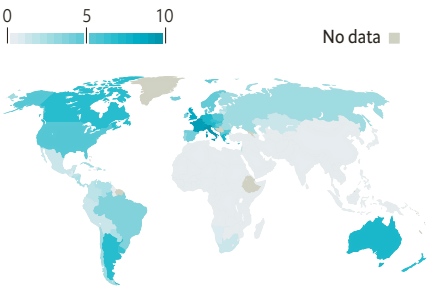



The musical style that best predicts liberalism is hip-hop; for conservatism, it is country. In 2016 Donald Trump's vote share in places where country out-sold hip-hop was 22 percentage points higher than in those where hip-hop was more popular. When combined into a statistical model, race, age, education and urbanisation account for only an 18-point gap. The remaining four points consist of factors reflected in music but not by demography.

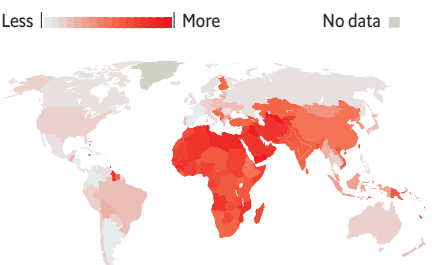
It stands to reason that rural whites who like rap, a genre in which artists have railed against police brutality, are unusually left-wing. The politics of hard-rock acts like Metallica, AC/DC and Guns'n'Roses—who are particularly popular in places that voted for Barack Obama in 2012 but Mr Trump in 2016—are less clear. Politically active rockers tend to lean left. However, the best-selling rock groups are older than most pop stars or rappers, suiting many Trump voters' nostalgia. And among Mr Trump's often rowdy fans, their belligerent, anti-establishment music may strike a chord. ■

**Populations originating in areas that spent longer under medieval Catholicism are more trusting and less conformist**

**Centuries of Christian influence, 500-1500AD**
Taking in subsequent population migrations




**Kinship intensity index,** including cousin marriage, extended families cohabiting, polygamy, marrying within the community




Source: "The Church, intensive kinship and psychological variation", by Jonathan Schulz and Joseph Heinrich et al., *Science*, November 2019
*0-30 years

**Time under Christianity in the Middle Ages v social attitudes**
By primary church exposure

# God and Mammon

### Medieval Catholicism nudged Europe towards democracy and development

WHY SOME countries are rich and others are poor is an enduring debate in economics. Natural resources and friendly climates help only a bit. In contrast, robust political institutions and a steady rule of law seem essential. But why did these precursors evolve in just a few dozen states?

One oft-cited theory, advanced by Robert Putnam of Harvard University, is that the crucial ingredient is "social capital", the affinity people feel for members of their society whom they do not know. Proxies for this sentiment, such as blood-donation rates or propensity to return a stranger's lost wallet, closely track GDP per person.

Social capital can take centuries to amass. Mr Putnam has shown that parts of Italy that were ruled by a feudal monarchy around 1300AD have low levels of social trust and are relatively poor today. In contrast, the Italian regions that formed city-states in that era, where citizens banded together for commerce and self-defence, are now unusually rich and well-run.

A recent study by Jonathan Schulz, Joseph Henrich and two other scholars proposes an explanation that delves even further back in time. They focus on family structure. Until recent human history, people lived in small groups and often married relatives. These habits reinforced family ties, but made people wary of outsiders.

In Europe this started to change around 500AD, when the Catholic church began banning polygamy and marriages between cousins, or between widows or widowers and their dead spouses' siblings. These edicts forced unmarried men to venture out and meet women from different social groups. The paper says that this reduced Christians' "conformity and in-group loyalty", and made them trust strangers more. By expanding the community beyond clans, it helped create the broad solidarity on which development may depend.

To show that Christian dogma caused this shift, the authors match historical data on the spread of religion with modern indicators. In places where Catholicism was generally the leading religion from 500-1500AD, people score highly on measures of independence, impartiality and trust—such as agreeing to testify against a friend whose reckless driving killed a pedestrian. The same pattern occurs in countries settled mostly by Christian migrants, such as America. In contrast, social trust is lower and marriage between cousins is relatively common in areas whose populations do not descend from medieval Catholics.

This effect distinguishes Catholicism from other strands of medieval Christianity. Years spent before 1500AD under Eastern Orthodoxy, which the authors say did less to police marriage within families, was a weaker predictor of "pro-social" survey responses than exposure to Catholicism was. Moreover, the trend holds up both between and within countries. Among Italian regions, those with high social capital (as measured by data like using cheques over cash) were influenced by Catholicism for longer than those lacking it were.

The study's subject limits the strength of its findings. Barring an experiment to assign religions to countries at random and monitor them for 1,500 years, no one can prove whether incest bans built social trust or merely coincided with it. Nonetheless, the paper bolsters the case for studying ancient history to understand the present. ■

# Death and taxes

**A new study tries to assess whether inheritance taxes boost net revenues**

Among the Democrats seeking America's presidency, wealth taxes are a core division between the left and centre. Experts disagree on whether plutocrats can wriggle out of such levies, because few rich countries use them. Data on inheritance taxes, a close cousin, are also spotty. But a new study by Enrico Moretti of the University of California, Berkeley and Daniel Wilson of the Federal Reserve Bank of San Francisco suggests that at the state level, governments can reap gains from estate taxes, even though they are easy to avoid.

Their working paper makes use of a natural experiment. Estate taxes in America vary by state. However, before 2001 all ultra-rich Americans paid the same rate, because the federal government offset state-level estate taxes with a dollar-for-dollar credit. George W. Bush's first tax law ended this rule. That made dying in Idaho, which has no estate tax, cheaper than in Washington state, which charges up to 20%.

The rich can only avoid federal taxes by renouncing citizenship. However, they can dodge state levies by moving. If they prioritise preserving their heirs' fortunes, then states that taxed inheritances after 2001 should have become bereft of billionaires.

The study supports this theory. The authors did not know where the rich resided for tax purposes. Instead, they relied on *Forbes* magazine, which estimates billionaires' net worth and assigns them to specific states. Starting in 2001, people whose listed state changed were much more likely to switch from states that charged an estate tax to ones that did not than the reverse.

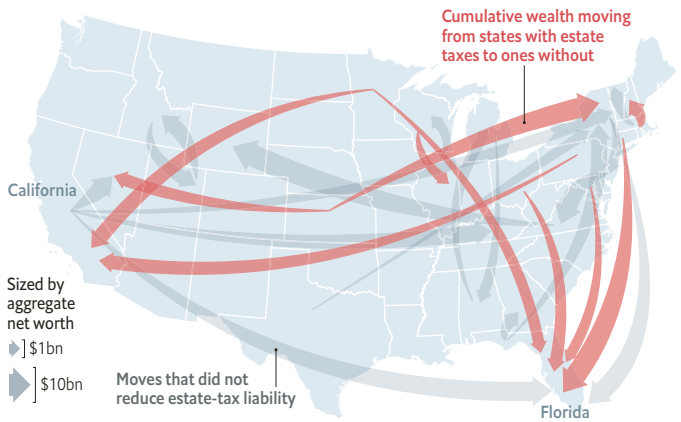
Overall, estate-tax states lost 35% of their listed billionaires, and 50% of those aged over 65. If such moves reflected real changes in tax residence, they would cost states both estate taxes and the income taxes the departed would otherwise have paid.

However, the windfall from billionaires who stay is huge. In 1996 revenue in Arkansas rose by $148m after Bud Walton, a founder of Walmart, died. The authors find that of the 13 states that kept the tax, nine came out ahead. On average, states lose 60-70% of potential estate-tax proceeds as the rich flee. The rest can go to schools and roads.

Estate taxes do not always raise money. A few states tax income so heavily that an estate tax which led the rich to move away would cost them revenue. But *Forbes*'s data imply that enough tycoons want to "age in place" to make their heirs juicy targets. ■

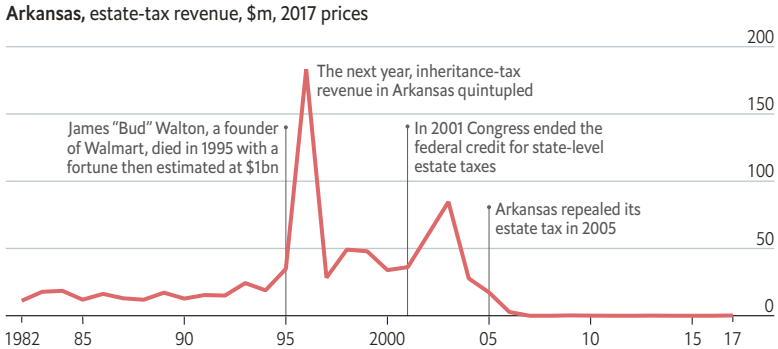
## → States without estate taxes tend to lure ageing billionaires

Changes in listed residence for Americans aged 65 and over on the *Forbes* 400 list, 2002-17

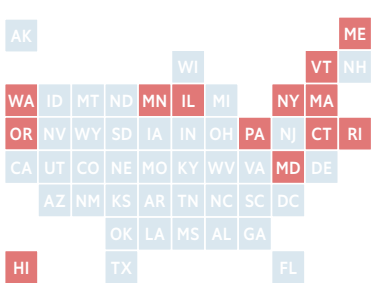



## → But states that tax inheritances still reap windfalls from those who stay put

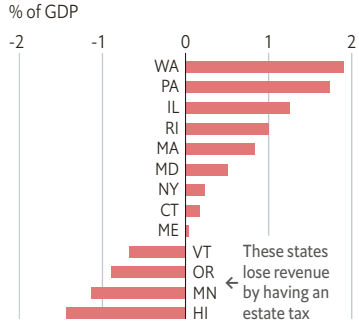
**Arkansas**, estate-tax revenue, $m, 2017 prices




**States with an estate tax***
2019

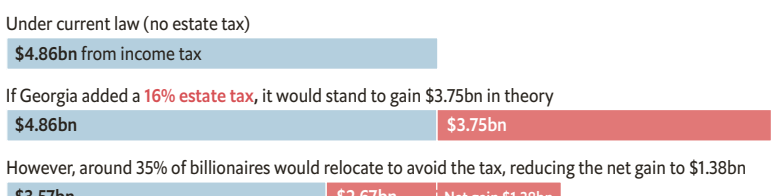



**Net fiscal impact of typical estate tax†**
% of GDP




## → Despite billionaire flight, many states would profit from taxing inheritances

**Georgia**
Real net present value of future estate and income taxes paid by current billionaires, Nov 2019

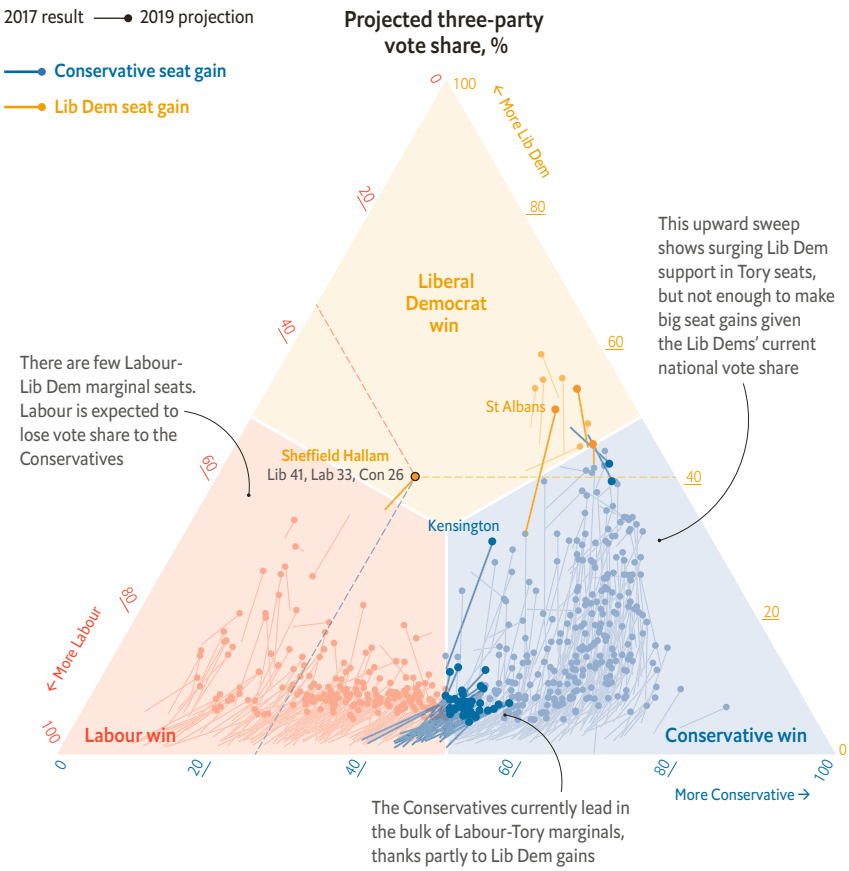



*Or functionally equivalent inheritance tax †Change in net present value of billionaires' tax payments resulting from estate tax, based on a $5.5m exemption and 16% top rate, Nov 2019

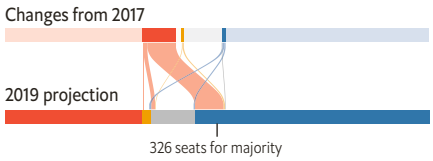
Sources: "Taxing Billionaires: Estate Taxes and the Geographical Location of the Ultra-Wealthy", by Enrico Moretti and Daniel J. Wilson, Oct 2019; *The Economist*

**The Liberal Democrats could win seats directly from the Tories, but hurt Labour in Conservative-Labour marginals**

England and Wales, general election 2019 YouGov projection

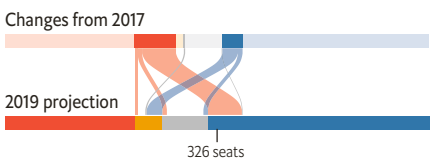



Based on current forecasts the Conservatives are expected to win a 68-seat majority



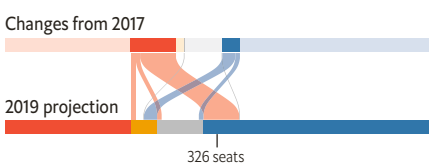

Con 359 Lab 211 Lib Dem 13 Others 67

If the Lib Dem vote surges to 23%, gained equally from all parties, the Tory majority is 28 seats




Con 339 Lab 199 Lib Dem 42 Others 70

If this surge draws heavily from Remainers backing Labour reluctantly, the Tories get a 42-seat majority




Con 346 Lab 193 Lib Dem 40 Others 71

Sources: Electoral Commission; British Election Study; YouGov; Chris Hanretty, *Political Studies Review*, 2019; *The Economist*

# Yellow submarine

**If the Lib Dems surge, they could hurt the Tories as much as Labour**

Perhaps the only view shared by Britain's big parties is that backing the Liberal Democrats is a dire risk. "A vote for the Lib Dems gets you Brexit," Labour warns. "A vote for the Lib Dems risks putting Corbyn in Downing Street," claim the Tories.

Both sides cannot be right. However, survey data of 100,000 Britons from YouGov, a pollster, imply that both parties are wrong. Because the Lib Dems have pulled votes equally from their two rivals, further growth in their support would probably cost both Labour and the Tories seats.

With Labour neutral on Brexit, the Lib Dems are the main national pro-Remain party. Voters have noticed. YouGov's data show that the few Leavers who backed the Lib Dems in 2017 largely plan to defect. But the party should pick up a fifth of the Remainers who voted Conservative last time, and 13% of Remain-supporting Labourites.

This has doubled the Lib Dems' vote share, from 7% in 2017 to 14% in YouGov's poll. But it may not yield many new seats, because Lib Dem voters are spread out geographically. YouGov matched personal data from respondents with the demography of each constituency to estimate voting results in every seat. The Lib Dems come first in just 13.

Jo Swinson's party has fallen back in recent polls. However, late surges are common in British elections, particularly when tactical voting is widespread. How might the race change if the Lib Dems approach the 23% vote share they won in 2010?

To find an answer, we scaled up their popularity in every constituency to reach a scenario in which their national vote share was 23%. First, we grouped Britons based on their Brexit vote and whom they supported at the last general election—for example, Leavers who voted Lib Dem in 2017. According to YouGov, just 30% of these people plan to stick with the Lib Dems. To get to a national share of 23%, the party would need its support in this category to double. Next, we estimated how many voters in each group (such as Labour Leavers) live in each constituency, to determine the seat-by-seat impact of a Lib Dem surge.

In terms of winning seats in England for themselves, the Lib Dems pose a serious threat only to the Tories. There are 13 seats in which those two parties are the front-runners and are separated by a single-digit margin. Between the Lib Dems and Labour, the only close fight is in Sheffield Hallam.

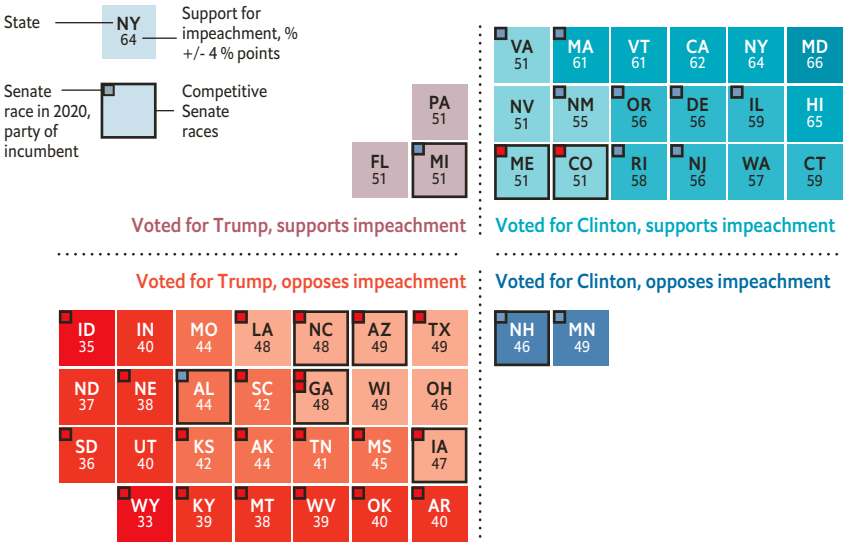
However, the Lib Dems could still hurt Labour, by taking votes from the left-wing party and letting the Tories sneak through. This is especially likely in Tory-Labour marginals in the north and Midlands.

Which of these two effects is larger depends on tactical voting. We explored two endings for our hypothetical scenario: one in which Lib Dems surge uniformly, and one in which they disproportionately rally in seats where their former supporters have reluctantly flipped to Labour, hoping to prevent a hard Conservative Brexit.

If the swing is uniform, the Tories will lose out most, with perhaps 25 seats going from blue to yellow. If tactical Labour voters flock back to the Lib Dems, it will be Jeremy Corbyn who suffers more. But in both cases, late gains for Britain's third party would leave the main two worse off. ■

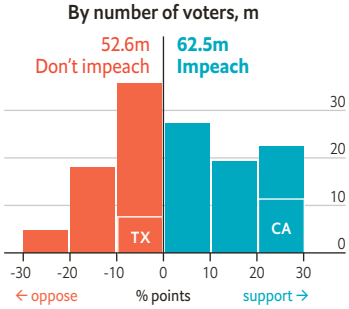
**The Senate overrepresents less-populated states, which are disproportionately opposed to impeachment**

Estimated support for impeachment* and vote in presidential election in 2016
By state, at December 4th 2019

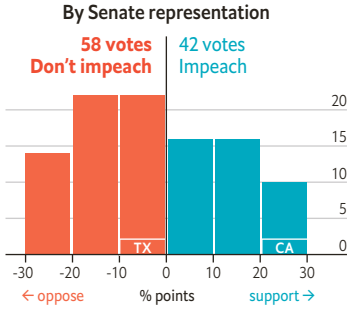



Estimated net support for impeachment*

By number of voters, m

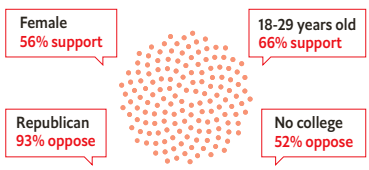



By Senate representation

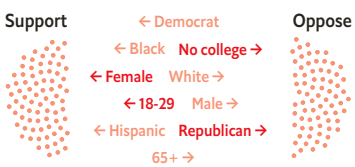



**How our "multi-level regression and post-stratification" model works**

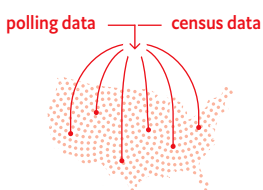
1 YouGov surveyed 18,000 Americans, asking them about their backgrounds and whether they support or oppose impeachment




2 We built a statistical model–a "multi-level regression"–that measures how each demographic trait affects support for impeachment




3 We applied this model to the demography of each state to predict the share of its residents who support impeachment (the "post-stratification")




Sources: United States Census Bureau; YouGov; *The Economist* *Excludes don't knows

# All the wrong places

### A plurality of Americans—but not of states—want Donald Trump impeached

DONALD TRUMP owes his presidency to America's quaint system of electing leaders. Despite losing the popular vote, he prevailed in the electoral college by winning lots of states by small margins and losing a few by large ones. Now, as Democrats prepare to impeach him, a similar quirk is helping him stay in office—and insulating his party from voters' wrath.

Whereas the electoral college is only mildly anti-majoritarian, the Senate often deviates wildly from the popular will. Because each state is weighted equally, voters in less-populous states are over-represented relative to those in large ones. Now that Republicans derive an outsize portion of their support from rural voters, their share of senators exceeds their share of total votes cast in Senate elections.

This imbalance weighs on the politics of impeachment. Even if the Senate were apportioned by population, as the House of Representatives is, it would not reach the two-thirds majority needed to convict the president. However, if the chamber reflected public opinion more closely, some Republican members seeking re-election might feel obliged to support his removal.

In reality, Republicans are likely to benefit from closing ranks around Mr Trump. To determine senators' incentives, we estimated opinions on impeachment using a method called multi-level regression and post-stratification (MRP). Its first step uses a national survey—YouGov, a pollster, gave us data from 18,000 people—to measure how demographic traits affect views (eg, Hispanic voters over age 64 tend to oppose impeachment). Next, MRP applies these relationships to the demography of each state, mimicking 50 separate state polls.

The result should make Democrats nervous. Although 52% of voters with an opinion back impeachment, that is less than the 55% who disapprove of the president. This means that a block of voters dislikes him, but wants Congress to leave him in place.

Moreover, in 29 of the 50 states, a plurality of voters opposes impeachment. Views split about 50/50 in Colorado, Maine and Arizona, giving those states' Republican senators little reason to buck their party ahead of tough re-election races. Impeachment is unpopular in Iowa and North Carolina. Surprisingly, Texas, long a Republican bastion, is also 50/50. But most pundits put its Senate seat out of the Democrats' reach.

Meanwhile, Democrats may struggle to keep their caucus on side. Voting to remove Mr Trump might end Doug Jones's hope of re-election in deep-red Alabama. And although divided public opinion will probably prevent defections in Minnesota and Michigan, New Hampshire is an outlier. Despite voting for Hillary Clinton in 2016, MRP finds that impeachment trails there by 48% to 41%. Jeanne Shaheen, a Democratic incumbent in the state, is expected to win re-election, but far from assured. If she backs impeachment, Republicans might gain the chance to pick up a seat in a cycle when they are mostly on the defensive. ■

# The Trump bump

**America's president dominated readers' attention again in 2019**

IF THERE IS no such thing as bad publicity, then 2019 was a roaring success for Donald Trump. America's president has faced withering criticism, from Republicans enraged by his withdrawal of troops from Syria as well as Democrats seeking to impeach him. But even if much of the attention he receives is negative, Mr Trump has a vice-like grip on news consumers. According to Chartbeat, a company that measures audiences for online journalism, readers of the sites in its database spent 112m hours in 2019 devouring stories that mentioned Mr Trump—the most of any keyword.

Chartbeat monitors a wide swathe of coverage. In an annual summary of readership calculated for *The Economist*, it compiled data on 4m articles from 5,000 sites across 34 topics. Half of the publishers it tracks are in English-speaking countries, and a quarter in continental Europe.

Although no subject rivals Mr Trump for sustained interest, readership about him on specific days often lagged behind breaking news. The event that most riveted audiences was the fire that gutted Notre Dame cathedral in Paris on April 15th, with 1m reading hours in its immediate aftermath. The journalistic cliché that "if it bleeds, it leads" held up well in 2019, as the top ten events also included mass murders in New Zealand on March 15th and America on August 3rd. But the mostly Western readers tracked by Chartbeat paid less attention to long-running violence in poor parts of the world. Afghanistan got 2m hours in 2019, as much as Mr Trump generates in a week.

Readers did devote time to less grim topics as well. Of the sporting events in our selection, England's victory over New Zealand in the semi-final of the men's Rugby World Cup generated the most interest. In football Liverpool's miraculous comeback against Barcelona in the Champions League semi-final also glued the public to their screens. The dull finals for both events drew less attention, however, showing that the importance of a match matters less than how surprising its result is.

Another kind of underdog helped drum up attention to climate change. In September Greta Thunberg, a 16-year-old Swedish activist, gave an impassioned speech to the UN that drew 400,000 hours of reading time. Meanwhile, climate-related wildfires in Australia, Brazil and California received 10m hours—a respectable haul, but no match for Mr Trump's fire and fury. ■

**US politics**
- Donald Trump
- Impeachment
- Elizabeth Warren
- Joe Biden
- Bernie Sanders

**World events**
- Brexit
- Protests
- US-China trade war
- NATO
- Outer space
- Jeffrey Epstein

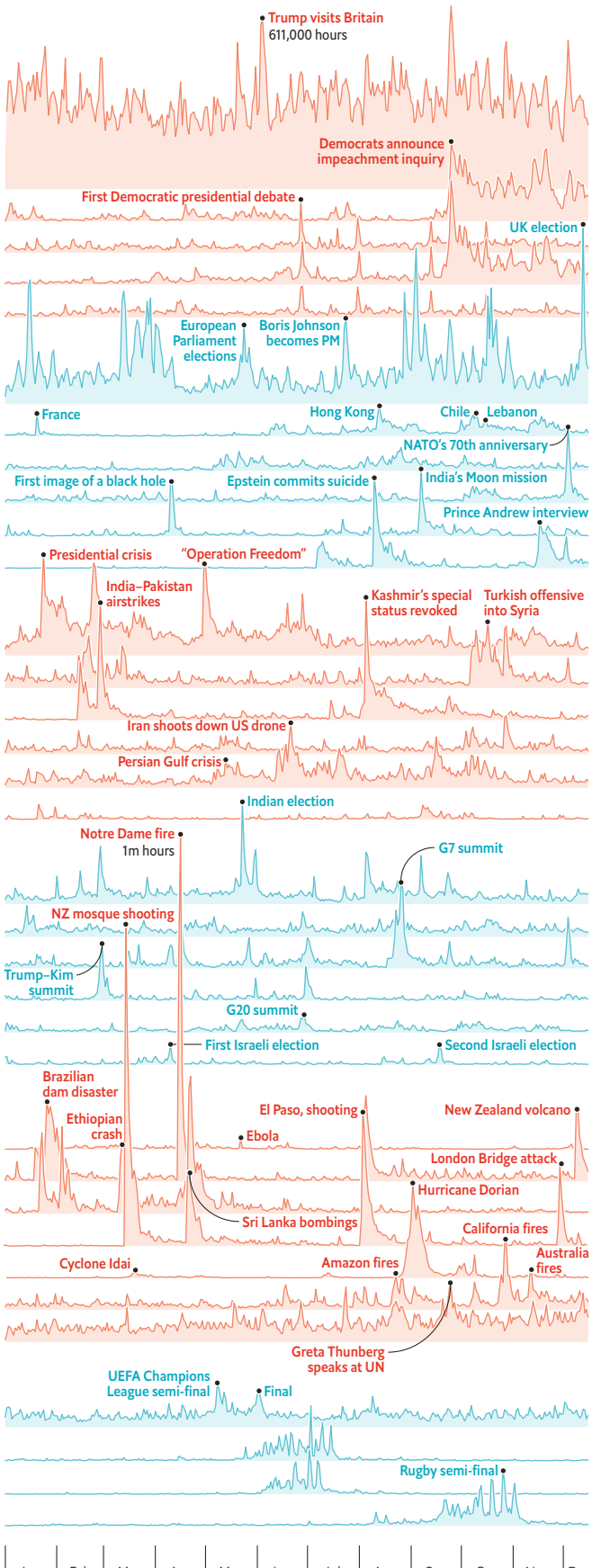
**Conflicts**
- Venezuela
- Syria
- Kashmir
- Iraq
- Iran
- Afghanistan

**Leaders**
- Narendra Modi, India
- Vladimir Putin, Russia
- Emmanuel Macron, France
- Kim Jong Un, North Korea
- Xi Jinping, China
- Binyamin Netanyahu, Israel

**Disasters and attacks**
- Disease
- Tragedies
- Plane crashes
- Terrorism
- Storms
- Wildfires
- Climate

**Sport**
- Liverpool FC
- World Cups: Cricket (men's)
- Football (women's)
- Rugby union (men's)

Readership per day across relevant news articles, 2019, hours




Sources: Chartbeat; *The Economist*

economist.com/graphic-detail