

# The Economist

JUNE 9TH-15TH 2018

Xiaomi rewrites the rules of business

The gain in Spain

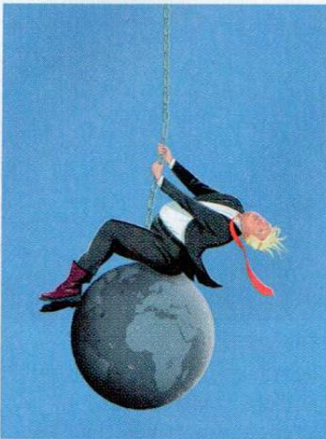
AI and jobs: the radiologist's tale

How to win the World Cup

# America's foreign policy



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**On the cover**

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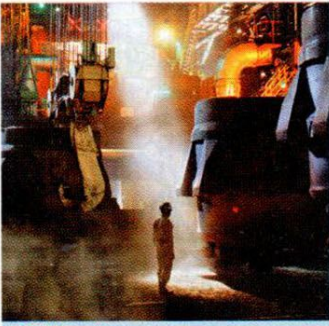
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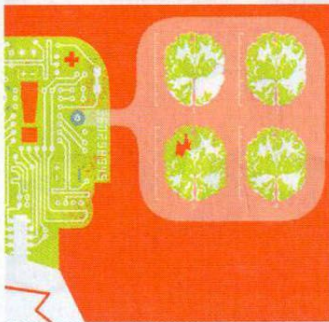
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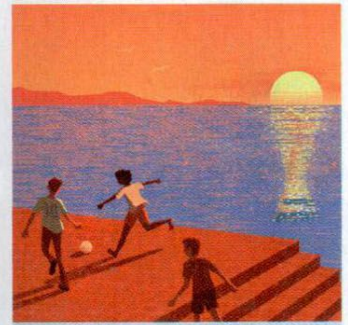
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## Politics



**Italy** at long last got a new government. Nominally headed by a non-political lawyer, Giuseppe Conte, it is in reality an uneasy coalition formed from the populist left-wing Five Star Movement and the nationalist Northern League. It is promising both tax cuts and benefit increases, which could rapidly clash with the EU's budget rules.

**Spain** got a new government, too. Its prime minister, Mariano Rajoy, was ousted by a censure motion related to old corruption charges against his party. The new prime minister is Pedro Sánchez, of the Socialist party, which controls only 24% of the seats in the lower house.

In **Slovenia**, an anti-immigrant party won the most seats in a snap election, but fell short of a majority. Forming a government may prove difficult or impossible, since other parties refuse to deal with it.

**A volcanic disaster**

Scores of people died and nearly 200 were missing after the eruption of the Fuego volcano in **Guatemala**. Fast-moving pyroclastic flows of gas, ash and lava engulfed nearby villages. The eruption sent plumes of ash 6km (3.7 miles) into the atmosphere. Guatemala declared three days of mourning.

**Nicaraguan** security forces killed nine people in the city of Masaya. That brings to at least 127 the number of people who have been slaughtered since protests began in April against the authoritarian rule of President Daniel Ortega.

A strike by lorry drivers in **Brazil**, which blocked roads and led to shortages of fuel and food, ended after ten days. The government agreed to subsidise diesel for 60 days to placate the drivers, whose strike was provoked by rises in fuel prices. Pedro Parente resigned as the chief executive of Petrobras, the state-controlled oil company, which sets fuel prices.

A **Mexican** federal court ordered the government to start a new investigation into the disappearance in 2014 of 43 students in Iguala in the state of Guerrero. The court said an earlier investigation by prosecutors, which found that police had turned over the students to drug gangs, had not been independent. The new one is to be overseen by a truth commission, which will be led by the victims' families and a human-rights group.

**Taxing times**

Thousands of people protested in **Jordan** against the government's plans to increase taxes and cut subsidies, part of an IMF-backed programme. King Abdullah responded by sacking the prime minister. He told the new government to review the entire tax system.

**Iran** is to build new centrifuges at the Natanz nuclear site, increasing its capacity to enrich uranium. But it said it would stay within the limits on enrichment set by the nuclear deal in 2015 with world powers, which America pulled out of last month. Highly enriched uranium is needed to produce nuclear weapons.

**Saudi Arabia** issued driving licences to ten women, weeks before a decades-old ban on

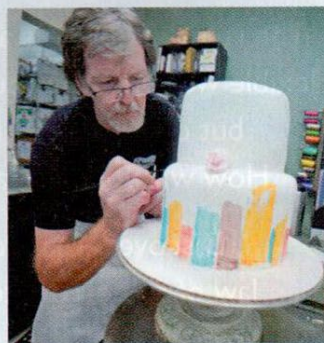
female drivers is lifted. Meanwhile, Saudi prosecutors said 17 activists had been detained, with eight released "temporarily". Some had been campaigning for women's rights.

**Ethiopia's** government said that it will implement a peace deal, signed in 2000, that ended a bloody two-year war with **Eritrea**. Ethiopia had refused to withdraw its troops from disputed territories awarded to Eritrea in 2002 by a border commission that was created by the deal. Abiy Ahmed, Ethiopia's new prime minister, also lifted a state of emergency, which was imposed by his predecessor following protests.

More than 1,000 people in the Democratic Republic of Congo were given an experimental **Ebola** vaccine, as health workers try to stop the spread of the disease.

**The golden prize**

More primaries were held to choose candidates for America's mid-term elections. **California** held a "jungle" primary, where the top two vote-getters go through to November regardless of party. Despite a crowded field that threatened to split the party's vote, Democratic candidates in the seven seats it is targeting in the state made it through. Gavin Newsom, a former mayor of San Francisco, became the Democratic candidate for governor.



In a 7-2 decision, the Supreme Court ruled in favour of a **Christian baker** who refused to fashion a same-sex wedding cake (though he offered to sell the couple any cake off the shelf). The court found that officials in Colorado had not given the baker a fair hearing.

But it did not spell out how lower courts should balance concerns about discrimination, compelled speech and religious freedom in future cases.

**Getting ready for a date**

**North Korea** removed three generals from their posts, prompting speculation that they opposed the forthcoming summit between Kim Jong Un, the country's dictator, and Donald Trump. The White House announced that the meeting will take place at a hotel on the Singaporean island of Sentosa.

**Malaysia's** new government appointed an attorney-general. Tommy Thomas, an ethnic Indian, is the first non-Malay to hold the job. He promised there would be "no cover-ups" in the investigation into the 1MDB scandal, in which billions of dollars were siphoned out of a development fund. Separately, the governor of Malaysia's central bank resigned.

A court in **Hong Kong** sentenced two pro-independence politicians and their three former aides to four weeks in jail for trying to barge into a meeting at Hong Kong's Legislative Council in 2016. The politicians had been elected as legislators but had been barred from taking their seats for not taking their oaths properly.

Police in the **Chinese** city of Chengdu raided an underground church and detained its pastor and several other people to prevent a planned service in commemoration of the violent suppression of the Tiananmen Square protests of 1989. America's secretary of state, Mike Pompeo, called on China to "make a full public accounting" of the massacre.

Rodrigo Duterte, the president of the **Philippines**, drew howls of protest from feminists for kissing a woman on the lips at an event for overseas Filipina workers. Mr Duterte said it was his "showbiz" style. The woman in question said "it meant nothing." >>

# Demolition man

Even if Donald Trump strikes a deal with North Korea, his foreign policy will harm America and the world



**P**ICTURE this: next week in Singapore President Donald Trump and Kim Jong Un crown their summit with a pledge to rid the Korean peninsula of nuclear weapons. A few days later America and China step back from a trade war, promising to

settle their differences. And in the summer, as sanctions bite, the streets of Tehran rise up to cast off the Iranian regime.

These gains would be striking from any American president. From a man who exults in breaking foreign-policy taboos, they would be truly remarkable. But are they likely? And when Mr Trump seeks to bring them about with a wrecking ball aimed at allies and global institutions, what is the balance of costs and benefits to America and the world?

## Don't you ever say I just walked away

You may wonder how Mr Trump's narcissism and lack of detailed understanding could ever transform America's standing for the better. Yet his impulses matter, if only because he offers a new approach to old problems. Like Barack Obama, Mr Trump inherited a country tired of being the world's policeman, frustrated by jihadists and rogue states like Iran, and worried by the growing challenge from China. Grinding wars in Afghanistan and Iraq, and the financial crisis of 2008, only deepened a sense that the system of institutions, treaties, alliances and classically liberal values put together after 1945 was no longer benefiting ordinary Americans.

Mr Obama's solution was to call on like-minded democracies to help repair and extend this world order. Hence the Iranian nuclear deal, choreographed with Europe, Russia and China, which bound Iran into the Nuclear Non-Proliferation Treaty. And hence the Trans-Pacific Partnership, which sought to unite America's Asian allies around new trading rules that would one day channel Chinese ambitions.

Mr Trump has other ideas. He launched air strikes on Syria after it used nerve gas in the name of upholding international norms—and thus looked better than Mr Obama, who didn't. Otherwise he treats every relationship as a set of competitive transactions. When America submits to diplomatic pieties, conventions or the sensitivities of its allies, he believes, it is negotiating with one hand tied behind its back.

If any country can bully the world, America can. Its total military, diplomatic, scientific, cultural and economic power is still unmatched. Obviously, that power is there to be exploited, which is why every president, including Mr Obama, has used it to get his way abroad even if that involves threats, intimidation and, occasionally, deception. But it is hard to think of a president who bullies as gleefully as Mr Trump. No other modern president has routinely treated America's partners so shoddily or eschewed the idea of leading through alliances. None has so conspicuously failed to clothe the application of coercive power in the claim to be acting for the global good.

In the short term some of Mr Trump's aims may yet succeed. Iran's politics are unpredictable and the economy is

weak. Mr Kim probably wants a deal of some sort, though not full disarmament (see Asia section). On trade, China would surely prefer accommodation to confrontation.

Yet in the long run his approach will not work. He starts from false premises. He is wrong to think that every winner creates a loser or that a trade deficit signifies a "bad deal". He is wrong, too, to think that America loses by taking on the costs of global leadership and submitting itself to rules. On the contrary, rules help deter aggressors, shape countries' behaviour, safeguard American interests and create a mechanism to help solve problems from trade to climate change. RAND, a non-partisan think-tank, has spent two years assessing the costs and benefits of the postwar order for America. It powerfully endorses the vision that Mr Trump sneers at—indeed, it concludes, this order is vital for America's security.

Mr Trump's antics would matter less if they left the world order unscathed (see Briefing). But four years will spread anarchy and hostility. The trading system will be unable to enforce old rules or forge new ones. Short of a war with, say, Russia, America's allies will be less inclined to follow its lead. In Europe more voices may complain that sanctions against Russia are harmful. In Asia countries may hedge against America's unreliability by cosyng up to China or by arming themselves, accelerating a destabilising arms race. Countries everywhere will be freer to act with impunity. These changes will be hard to reverse. Sooner or later, America will bear some of the costs.

Worst of all, Mr Trump's impulses mean that China's rise is more likely to end in confrontation. He is right to detect a surge in Chinese ambitions after the financial crisis and the arrival of Xi Jinping in 2012. That justifies toughness. But Mr Trump's dark, zero-sum outlook is destined to lead to antagonism and rivalry, because it refuses to see that China's rise could benefit America or to follow the logic that China might be content to live within a system of rules that it has helped devise.

## I just closed my eyes and swung

If the "master negotiator" so underestimates what he is giving up, how can he strike a good bargain for his people? He values neither the world trading system nor allies, so he may be willing to wreck it for the empty promise of smaller bilateral deficits. That could lead to retaliation (see next leader). Iran could resume nuclear work, as ruling clerics ape North Korea's strategy of arming themselves before talking. Mr Trump may give Mr Kim the prize of a summit and an easing of sanctions in exchange for a curb on North Korea's long-range ballistic missiles. That would protect America (and be better than war), but it would leave Asian allies vulnerable to the North's nukes. America First today; in the long run America Alone.

America's unique willingness to lead by fusing power and legitimacy saw off the Soviet Union and carried it to hegemony. The world order it engineered is the vehicle for that philosophy. But Mr Trump prefers to fall back on the old idea that might is right. His impulses may begin to impose a new geopolitics, but they will not serve America or the world for long. Remember the words of Henry Kissinger: order cannot simply be ordained; to be enduring, it must be accepted as just. ■

### The role of central banks

The Free exchange column in your issue of May 26th recommended that central banks grant the general public access to their digital currencies by offering accounts to everyone. Thus, in times of recession, the interest paid on these digital-currency accounts would become a potent tool for monetary policy. However, offering this service directly to the public raises fundamental questions. A central bank might become a superpower in retail banking, disrupting traditional commercial banking by refinancing the credit supply via deposits. Commercial banks would have to increase interest rates accompanied by a fall in their margins in deposit and lending, endangering financial stability. In periods of stress, there is a high risk of digital bank runs.

The column also argues that accounts for everyone could distribute more “helicopter money”, or newly minted money, to the public. However, the distribution of a central bank’s money as a giveaway to the public is not merely an accounting problem. It would involve distributional decisions that are usually the domain of elected governments, not of independent central banks.

PROFESSOR JOACHIM WUERMELING  
Member of the executive board  
Deutsche Bundesbank  
Frankfurt

### Data points

Another reason why the life-insurance industry is struggling (“Declining years”, May 19th) is that it is unable to quantify longevity risk fully in relation to the solvency of life-insurance portfolios. Life insurance is too dependent on actuarial statistics that extrapolate from the past and are rather poor in assessing this risk. The adage that past results do not guarantee future performance applies in this case.

A study by the IMF on life expectancy argued that mortality tables used by life-insurance actuaries exacerbated longevity risk within the

industry by underestimating how long people will live. So rather than looking at the past, models on longevity risk need to take account of factors such as the pace and duration of improvements in life expectancy that can potentially occur in the future.

WEIMENG YEO  
Newark, California

One emerging trend in the industry is “shared value insurance”. Because life insurers make more money when people live longer, their profits are aligned with their customers’ good health. Life insurance can encourage healthier lifestyle choices with financial incentives. The idea is to help customers overcome cravings for instant gratification and stop being over optimistic about their health, which behavioural economists say lead to unhealthy lifestyles.

The shift from infectious to lifestyle diseases has been significant. Just three choices—physical inactivity, an unhealthy diet and smoking—now cause more than 50% of deaths and 80% of the disease burden, according to the Oxford Health Alliance. This opens up a new role for life insurers, but one that is complementary and supportive of their core product of protecting people against the unplanned contingencies of life.

This model has been successfully implemented in South Africa, where demonstrable increases in life expectancy have been observed, and is now being adopted by a network of some of the largest global insurers in their market, including Ping An, AIA, Generali, John Hancock, Manulife and Sumitomo.

ADRIAN GORE  
Group chief executive  
Discovery Vitality  
Johannesburg

### Our new column on work

I look forward to reading more of Bartleby’s reflections (May 26th). Many workers ponder day in and day out that if economic survival was possible without the wholesale occupation of employment,

what would life involve and would there be meaning to it of the sort that Herman Melville’s Bartleby wanted? As the growth of services, artificial intelligence and better redistribution make these a tangible reality, we have an unparalleled opportunity to spread the benefits of economic well-being that Westerners have enjoyed for over 100 years.

DEEP SAGAR  
Berkhamsted, Hertfordshire

### Politics in Singapore

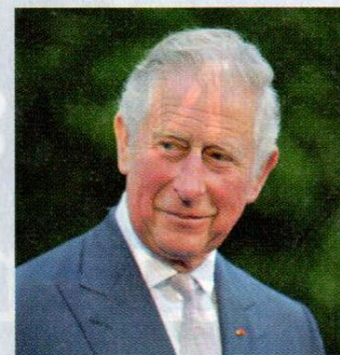
Your Banyan columnist (May 26th) notes that “voting is clean” in Singapore. Furthermore, that the ruling People’s Action Party (PAP) has won 14 general elections since 1959 because it runs “the country competently”. I thank Banyan for the compliment. After all, how many former British colonies are there where voting has always been clean and their governments consistently competent?

But Banyan insists there is more to the PAP’s longevity: a “favourable electoral system” and a cowed electorate, among other things. The PAP won 70% of the popular vote in the last general election. Could a “favourable electoral system” have delivered that? Your correspondents have been stationed in Singapore for decades. Did Singaporeans strike them as a people easily brainwashed into believing that the PAP and Singapore are “synonymous”?

Singaporeans are well-travelled, well informed and some even read *The Economist*. They continue to vote for the PAP because it continues to deliver them good government, stability and progress. The PAP has never taken this support for granted. As Lee Hsien Loong, the prime minister, noted recently, the political system is contestable. We have kept it so. The PAP could well lose power, and would deserve to do so if it ever became incompetent and corrupt.

FOO CHI HSIA  
High commissioner for  
Singapore  
London

### Some good advice



Bagehot thinks that a good constitutional monarch is one who keeps his thoughts to himself (May 19th). Monarchs are not elected, so in a democracy they should not have the power to turn their opinions into laws. Fair enough. But denying royals the possibility of expressing well-informed, competent views takes this point too far, and deprives a country of a valuable source of independent thought, arguably like NGOs, which are also unelected and politically un beholden. Consider Prince Albert’s soft-power contribution to industrial-age Britain.

Bagehot dismisses Prince Charles’s views as unconventional, though admittedly prescient at times. Those are two qualities not in abundant supply in political soundbites. Perhaps it takes a monarchy to take up a certain kind of advocacy, where votes do not factor in. Agree with him or not, I fail to see why a thinking monarch is any less “dignified” for it.

EDWARD CECIL  
Madrid

### Peculiar politicians

I suggest the hyphen is redundant in this line from your piece on “Cabinet splits and party twists” (May 12th) over Brexit: “the European Research Group consists of 60-odd backbenchers”.

ANDREW BILLINGTON  
Marsden, West Yorkshire ■

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### The Trump-Kim summit

## Pushing the envelope

BEIJING AND SEOUL

Talks between America and North Korea might succeed, but at an alarming price

WHEN a great power promises a smaller country a “win-win” deal, diplomats mordantly joke, that means the great power plans to win twice. Yet the summit between America and North Korea in Singapore on June 12th may prove an exception: a negotiation that could conceivably allow not only the two main protagonists to preen and claim victory, but that might also please several interested observers. Both South Korea and China have high hopes for the meeting. Japan is more suspicious. But the biggest loser, if a deal is struck, is likely to be totally obscured by the flashing cameras and swooning anchors: the American-led security architecture that has brought decades of stability to Asia.

The summit is taking place in a posh hotel on Sentosa Island, a resort district connected to the rest of Singapore by bridge, cable-car and monorail. Close at hand are many golf courses, beaches, a wax museum and a Universal Studios theme park, complete with a space ride billed as an “intergalactic battle between good and evil” and “Revenge of the Mummy”, which promises a “plunge into total darkness”.

“Sentosa” is a Malay word meaning “peace” or “tranquility”. This is seen as a good omen in South Korea, where fortune-tellers and pregnant symbolism are held in

high regard. The island only acquired its current name in 1972, however, with help from Singapore’s tourism board. Before that, it was known as “Pulau Blakang Mati”, which translates as “Island of death from behind”.

Diplomacy between America and North Korea has always had a surreal edge. At a powwow in 2000 in Pyongyang, the North Korean capital, Madeleine Albright, then America’s secretary of state, was greeted with mass callisthenics and bayonet drills. The two sides have been negotiating over the North’s nuclear-weapons programme since 1992, when Kim Il Sung, the grandfather of the current despot, Kim Jong Un, was in power (see timeline on next page). The North has broken many promises to forgo nuclear arms. Korea-watchers have long debated whether the Kim regime sees nuclear weapons as vital to its survival, or rather as useful leverage over the outside world. After all, the North’s ability to pound the capital of the South, Seoul, with thousands of dug-in artillery pieces has given it decades of deterrence without nukes.

Either way, the “complete, verifiable and irreversible disarmament” that America seeks is probably out of reach. But the summit could still be declared a success, as both President Donald Trump and the

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young Mr Kim seem keen to make it so. Simply meeting face-to-face will allow them to crow about their fortitude and foresight in forcing the other to the table.

The White House staked early bragging rights on June 4th. Team Trump marked the boss’s 500th day in office—or as aides put it, “President Donald J. Trump’s 500 days of American Greatness”—with an assertion that the American-led campaign to tighten UN sanctions on North Korea over the past 18 months is responsible for pushing the North closer than ever before to giving up its deadly arsenal. Under Mr Trump, America has pursued a policy of “maximum pressure” on the North, including threats to rain “fire and fury” on it should it persist in its intransigence.

Back in his Stalinist dystopia, Mr Kim has peddled a conflicting but equally stirring story, says a scholar from a Chinese government-sponsored think-tank who travels to North Korea several times a year. “Kim Jong Un has told the North Korean elites that when they kept testing nuclear weapons and missiles last year, the aim was to force the United States to the table,” the scholar says. “So the North Korean people think this is a victory for Kim Jong Un.”

### Kodak moment

Beyond the immediate photo-ops, however, it is not clear what the summit will yield. American veterans of Korea talks have aired all sorts of possible inducements to get Mr Kim to disarm: the loosening of sanctions, big dollops of aid and investment, a formal peace treaty to end the Korean war, establishing diplomatic relations in the form of “interests sections” (one step short of embassies). Mr Trump has talked of offering “very strong” guaran- ▶▶



Hospices

# Loved to death

BEIJING  
**Taboos make it hard to provide good end-of-life care**

WHEN Li Songtang was 17, officials overseeing Mao's chaotic Cultural Revolution sent him from Beijing to Inner Mongolia, a northern province where he became a "barefoot doctor"—a medical worker with rudimentary training. His patients included an academic whom the government had expelled in disgrace from the capital, and who had become terminally ill. The patient grew sicker and increasingly troubled by his political black mark. Unable to console him, Mr Li eventually lied that he had persuaded authorities to wipe the slate clean. The patient grabbed his arm with relief and gratitude, recalls Mr Li. "I can still feel it today."

Mr Li's experience of caring for the dying man eventually resulted in the hospice he runs in a three-storey building in Beijing's outskirts. The facility is home to about 300 people, most of them elderly and with late-stage cancer (a patient there is pictured with a nurse). On a weekend the bright corridors are busy with volunteers who have come to chat with patients. Zhang Zhen'e, a smiley 76-year-old who shares her room with six other women, says she tries to stay cheerful because days spent worrying are "days lost". A nearby ward for dying babies, painted green and decorated with mobiles, is less easy to visit. Eight children snooze there, asleep in mismatched wooden cots.

Founded in the 1980s and bearing his name, Mr Li's Songtang Hospice was one of China's first end-of-life care centres. There are still far from enough of them. In 2015 the Economist Intelligence Unit, a sister-firm of this newspaper, ranked support provided to the dying in 80 countries. It placed China 71st, noting that specialised end-of-life care was available to less than 1% of its population and only in the biggest cities. Yet demand is growing as China ages and a growing number of its elderly people suffer from drawn-out diseases (the annual number of cancer diagnoses has doubled

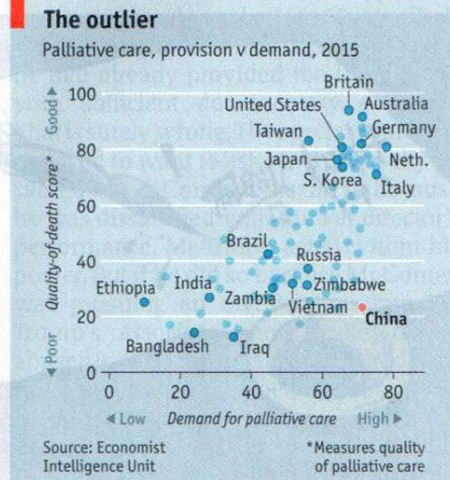
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since 2000). Younger people, many of whom have no siblings, are often too stretched to provide care for those for whom cure is impossible. Few countries face so wide a gap between the need for hospices and their supply (see chart).

One reason for the lack of care facilities is that cash-strapped hospitals have strong incentives not to create hospice wards, given that palliative treatments create much less revenue per patient than expensive curative ones. Some health workers think the best hospitals have an ethical duty to reserve their limited resources for people who have a chance of getting better.

Cultural inhibitions also impede the development of end-of-life care. Talking about death has long been taboo. People often feel that it is their filial duty to ensure that sick parents receive curative treatment, even when doctors advise that there is no chance of recovery and the treatment



## open future

As part of our Open Future initiative to remake the case for liberalism, *The Economist* is hosting an online debate from June 8th to 18th on the question: "Should the West worry about the threat to liberal values posed by China's rise?" Readers are encouraged to join the discussion at [economist.com/openfuture/china](http://economist.com/openfuture/china)





The rule of law

Pardon me?

WASHINGTON, DC

Donald Trump's powers are not quite as vast as his lawyers claim

JUST as a frog in warming water cannot sense its own destruction, America is said to be increasingly inured to the harm President Donald Trump is doing it. The scandals and affronts are too many and too various to keep in mind—and also too confusing. It is hard to tell a toxic tweet from a major corruption scandal from an attack on the constitution. Just as the frog begins to suspect there is something seriously amiss, along comes a reason to think his pond is just a bit warmer than normal.

An extravagant legal row this week suggests there may be little time left for complacency. In a leaked 20-page letter written to Robert Mueller, the special counsel who is, among other things, investigating Mr Trump for possible obstruction of justice, John Dowd and Jay Sekulow, both lawyers for the president at the time, made a series of breathtaking claims for the powers of his office. It amounted to an argument last heard from Richard Nixon: that the president is above the law. Yet the Republicans who control Congress, and are therefore chiefly responsible for checking the presi-

dent's ambitions, mostly played along. To extend the amphibian analogy, this illustrates a combination of executive activism and congressional dysfunction that has been simmering for decades. It has left America more vulnerable to a rogue president than at any time since Watergate.

The president's lawyers made three broad claims for their client. They said he was not obliged to submit to Mr Mueller's request for an interview, on the basis that he had already provided the investigator with sufficient documentary evidence. That is surely wrong. The special counsel is believed to want to ask Mr Trump why he sacked James Comey. If he did so because he was dissatisfied with the FBI director's performance, Mr Trump acted within his power. But if he did so because Mr Comey was pursuing an investigation into Mr Trump's associates' ties to Russia, he abused it. As the president has offered both explanations, Mr Mueller reasonably wants oral clarification from him on the matter. And in a rule-of-law state, Mr Trump has no political grounds to refuse

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that request or the subpoena the special counsel could enforce it with.

The lawyers also claimed that Mr Trump was in any event incapable of obstructing the course of justice because, as America's chief law enforcement officer, he could do whatever he liked with Mr Comey's investigation. That is a more ticklish argument: the obstruction laws are complicated and the ambit of presidential power vast. Yet, again, it rests on the question of Mr Trump's motivation. The president is entitled to exercise his constitutional powers, but not for corrupt purposes, which is why Mr Mueller's wants to ask Mr Trump what his purposes were.

Uneasy lies the head

In case the special counsel had the temerity to press his request, Mr Trump's lawyers raised a third spectre. The president "could, if he wished, terminate the inquiry, or even exercise his power to pardon if he so desired." Two days after the letter was published, Mr Trump echoed that point on Twitter. "As has been stated by numerous legal scholars, I have the absolute right to PARDON myself, but why would I do that when I have done nothing wrong?"

It is unclear whether he really does have that power. No president has pardoned himself before. And the notion that one could seem to jar with the view, held by most legal scholars, that the president cannot be indicted in office. The nearest thing to an authority on the matter, though ▶▶



## Brazil

## Too soon to party

SÃO PAULO

A lorry-drivers' strike that paralysed the country has ended. It will have big consequences for national elections in October

ASSEMBLANCE of normality returned to São Paulo, Brazil's biggest city, after a ten-day strike by lorry drivers that had paralysed traffic, shut down petrol stations and emptied grocery-store shelves. The annual gay-pride parade, held on June 3rd, brought 3m people to Avenida Paulista, the city's main street. Football fans packed bars to watch Brazil's team play a World Cup warm-up game against Croatia.

But this resumption of ordinary life is deceptive. The drivers' strike, called to protest against higher fuel prices, marks an ominous beginning to a political season that will culminate in national elections in October. It has demonstrated Brazilians' taste for irresponsible policies and boosted the prospects of the most extreme candidate in the presidential race, Jair Bolsonaro, a right-wing former army captain.

It also showed that the next president will have a hard time enacting the reforms needed to maintain economic stability. The strike ended only after Michel Temer, the country's unpopular president, agreed to subsidise diesel for 60 days and to adjust its price monthly rather than daily. That prompted the resignation on June 1st of Pedro Parente as chief executive of Petrobras, the state-controlled oil company, which had raised prices in response to higher international oil prices and a weaker real. The strike could prove to be a watershed moment for the elections, says Pablo Ortel-

lado, a professor of public policy at the University of São Paulo.

Although the lorry-drivers' rebellion made life miserable, 87% of Brazilians supported it, according to Datafolha, a pollster. As well as calling for cheaper fuel, many drivers demanded a crackdown on corruption and crime, which have dominated headlines under recent administrations, including that of Mr Temer. Petrobras has been a byword for graft. Under earlier bosses it was the conduit for enormous bribes paid by construction companies to politicians. Celso Rogerio Gomez das Neves, a mechanic taking a break at a corner bar in São Paulo, admits that Petrobras raised prices to compensate for higher costs, but also thinks that its executives were "stealing from the Brazilian people".

## Fear of Jair

Some drivers hung banners from their cabs demanding "military intervention" to deal with crime and corruption. Far-right groups dominated online discussion of those themes during the strike, according to an analysis by a data lab run by Fabio Malini, a scholar of internet culture at the Federal University of Espírito Santo. The digital savvy of the strikers, who organised through thousands of interconnected WhatsApp groups, foreshadows the role that social media are likely to play in the presidential election, says Mr Malini.

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Bello is away

Both the ideology and the techie tactics have echoes in the campaign of Mr Bolsonaro, whose Social Liberal Party counts for almost nothing but whose Facebook page has 5.5m followers. He tweeted support for the drivers but distanced himself from appeals for political intervention by the army. Military rule might "return by the ballot", meaning through the generals that he plans to appoint to his cabinet if he is elected, he told reporters at an evangelical "march for Jesus" on May 31st.

No candidate reflects better the electorate's anti-establishment mood. The proportion of Brazilians saying that "traditional political parties do not care about people like me" jumped from 69% in November 2016 to 86% in March this year, according to IPSOS Global, a pollster. The share who think Brazil needs "a strong leader who will break the rules" rose from 48% to 89%. Mr Bolsonaro "feeds off fear and hopelessness", says Cláudio Couto, a political scientist. His view that "a gay son needs a beating" appeals to some social conservatives. His iron-fisted approach to crime (he would give police a "blank cheque" to shoot miscreants) is popular with a bigger group. Like Donald Trump, or Rodrigo Duterte in the Philippines, he gets points for supposedly plain speaking. "He says what he thinks," says a taxi driver in São Paulo as he drops off a carful of revellers clad in rainbow colours at the pride parade.

In the first nationwide poll since the strike of voting intentions for the first round of the presidential election, Mr Bolsonaro came out ahead against three different lists of potential rivals, with 21-25% of the vote. Three-quarters of his supporters say they will not change their vote before election day. The only politician who outpolls him is Luiz Inácio Lula da Silva, a left-wing former president. But he is in jail for ▶▶



## Peace and privatisation

# Reformer-in-chief

ADDIS ABABA

Ethiopia's new prime minister is moving fast. Is it fast enough?

THE speed of events caught Ethiopians off guard. When Abiy Ahmed took office as prime minister on April 2nd he did so as the head of a deeply divided ruling coalition. The inexperienced 42-year-old, who came from the Oromo wing of the ethnically based coalition, was viewed with deep suspicion by many of his establishment colleagues. He was taking charge of a country under a state of emergency after more than three years of anti-government protests and ethnic unrest. Few expected him to achieve much soon.

The past few weeks have pleasantly surprised. After an inaugural address in which he called for unity and apologised for the government's killing of protesters, the former army officer toured the country to muster support. At mass rallies and town-hall meetings he adopted a strikingly different tone from that of his two most recent predecessors. Hailemariam Desalegn, who resigned in February, was timid and aloof. Meles Zenawi, who ruled as a strongman from 1995 to 2012, was stern and cerebral. Mr Abiy, by contrast, presents himself as a friend of the country's young protesters. "We want to work hand-in-hand with you," he told cheering crowds in Oromia, the centre of unrest.

Exiled opponents have been invited home. Representatives of dissident media outlets based abroad have been encouraged to set up shop in Addis Ababa, the capital. Terrorism charges against dozens of activists have been dropped, including

against a British citizen, Andargachew Tsige, who had been on death row.

Mr Abiy says he plans to amend the constitution and introduce term limits for his position. On June 2nd his cabinet said the state of emergency would be lifted two months earlier than planned. Then, on June 5th, the politburo of the ruling coalition, the Ethiopian People's Revolutionary Democratic Front (EPRDF), said it would at last implement a peace agreement, signed in 2000, that would hand over disputed territories to Eritrea and put a formal end to the war the two countries fought (and Ethiopia won) from 1998 to 2000. That could pave the way for reconciliation and, perhaps, give Ethiopia renewed access to Eritrea's ports.

### Busy, busy Abiy

Until this week Mr Abiy appeared to be paying less attention to Ethiopia's troubled economy. His few remarks suggested that he planned to leave untouched the staled development model pursued by the EPRDF since it came to power in 1991. At a meeting with business leaders in April he said that the government would preserve its monopoly in key sectors such as infrastructure, banking and telecoms. Few regarded him as an economic liberal.

So the news that the EPRDF would in fact liberalise swathes of the economy to boost growth and exports came as another shock. The plan, according to a statement released on June 5th, would see the gov-

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ernment opening state-owned telecoms, electricity and logistics, as well as the highly profitable national airline, to foreign investors for the first time. It would also allow full or partial privatisation of railways, sugar factories, industrial parks, hotels and some manufacturing firms.

Recent economic indicators seem to have jolted the government into action. A vast programme of public investment propelled annual GDP growth to around 10% for most of the past decade, albeit from a low base. But the IMF reckons that growth will slow by more than two percentage points this year (to a still respectable 8.5%). Public debt, most of which is in foreign currency, has hit almost 60% of GDP. There has been a spate of defaults on Chinese loans in recent weeks, and local contractors complain the government is not meeting its obligations. Earlier this year the IMF raised Ethiopia's risk of debt distress to "high" because of the possibility that it will not earn enough foreign currency to pay its debts.

Export revenues have barely budgeted for five years. In some important industries that the government is trying to promote, such as garments and leather goods, they have even declined. As a result, Ethiopia's foreign reserves are thought to cover just over a month's worth of imports. Businesses say the shortage of foreign exchange is the worst in recent memory; many have waited more than a year to receive their allocation from state-owned banks. Pharmacies are running low on basic medicines such as antibiotics. Solomon Mulugeta, general manager of the metal manufacturers' association, says factories are lying idle for want of raw materials. Inflation is running at nearly 15% a year.

The planned sell-offs should ease some of the hard-currency strains. The announcement also sends an important signal to foreign investors that the government is now serious about economic



Spain

# A smoothly executed takeover

MADRID

Pedro Sánchez tries to combine change, stability and a fragile mandate

WITH unforeseen suddenness, a new political era has begun in Spain. Having ousted Mariano Rajoy, the long-serving conservative prime minister, in a parliamentary censure by 180 votes to 169, this week Pedro Sánchez, the Socialist leader, formed a new government. It will be weak, commanding an even smaller minority in Congress than its predecessor, but not necessarily brief: a general election may not come for at least a year.

Mr Sánchez, a 46-year-old economist, has appointed a cabinet that mixes old faces from previous Socialist administrations with new figures, several from regional governments that his party runs. Its make-up sends three messages. Some are designed to rebut the charge by Mr Rajoy's People's Party that the new prime minister is a hostage to the Catalan nationalists and Podemos, a populist leftist party, whose parliamentary votes helped to bring him to office.

The first message is stability and commitment to Europe. Mr Sánchez has made a virtue of his limited support by pledging to stick to Mr Rajoy's budget (and its target of cutting the fiscal deficit to 2.3% of GDP). This would "guarantee the governability of our country at an extraordinarily complex moment", he said in Congress. Raising more than a few socialist eyebrows, he

named Nadia Calviño, currently the European Commission's director-general for budgets, as his economy minister.

Second, the new foreign minister, Josep Borrell, is an experienced former minister and president of the European Parliament, and also a Catalan. Mr Borrell campaigned against the drive for independence by

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Carles Puigdemont, Catalonia's former regional president. His appointment signals that the new government will uphold the constitution (which bars secession) and will be more active in making that case abroad.

Third, in a country where feminism is gaining ground, 11 of the new cabinet's 17 members are women. It is a cabinet "in the image of Spain", Mr Sánchez said, committed to social and gender equality as well as economic modernisation, with science and innovation as motors.

Such gestures will be an important part of Mr Sánchez's rule, because his scope for bringing about radical change is small. His Socialists, who have only 84 of the 350 seats in Congress, will govern alone. Mr Rajoy's PP had 134 seats and could count on Ciudadanos, a liberal party, with 32.

The ghost of the past

Before calling an election—due in the summer of 2020 at the latest—Mr Sánchez promises to roll back several measures (such as restrictions on freedom of assembly) imposed by the PP when it had a majority, and to which most of the current parliament is opposed. He promised a law requiring equal pay for equal work for women and men, and more efforts to help the long-term unemployed.

Above all, Mr Sánchez brings a breath of fresh air. Polls show that the country had tired of Mr Rajoy. He doggedly hauled Spain out of a deep economic slump with reforms of the broken financial system as well as of the labour market. But the constitutional crisis over Catalonia took its toll on his government. Above all, Mr Rajoy failed to grapple with, investigate or apologise for a steady stream of corruption cases



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### Mental health

## The long shadow

### The Grenfell fire, and its aftermath, have put many locals under unbearable strain

FOR two weeks, the families of those who died came to tell their stories to the Grenfell Tower Inquiry. The father who was flying home from Egypt while his family burned; the parents whose daughter had moved from Italy to London to make a life; the young man who stood and watched the flames as his mother and sister were trapped inside. Translators muttered live renderings of the speeches to friends and family unable to speak English. Sir Martin Moore-Bick, the judge who is leading the investigation, sat on stage and listened, seldom speaking except to offer words of condolence.

Since the fire at Grenfell Tower last June 14th, which killed 72 people and injured 70, official investigations have made slow progress. A review of building regulations produced cautious recommendations last month. Sir Martin's inquiry into the causes and aftermath of the fire published preliminary findings on June 4th. A criminal investigation, which is considering personal and corporate manslaughter charges, will probably conclude no earlier than 2019.

Less noticed than these legal proceedings is a parallel effort to tend to the minds of the many people affected by the fire. Such was the scale of the horror, the local arm of the National Health Service estimates that 11,000 people may end up suffering from mental-health problems. Most will be cases of post-traumatic stress disorder

(PTSD), but others will suffer from anxiety, depression and the exacerbation of existing conditions. As John Green, the psychologist leading the NHS mental-health response, notes, "it wasn't just the fire". What followed may have made things worse.

In the immediate aftermath, survivors struggled to find the support and quiet they needed to deal with what had happened. In the absence of co-ordinated assistance from the government, charities rushed in to help people, but often overwhelmed them. The area buzzed with volunteers bringing absurd quantities of clothing and food, as well as journalists looking for stories. In the end, says Cathy Long, who lives locally and is writing a report on the fallout of the fire for the London School of Economics, "we needed a relief effort to deal with the relief effort."

A year on, 129 of the 210 households that survived the fire remain in temporary accommodation or hotels. Many have yet to be offered somewhere they consider suitable; others struggle to make big decisions about where to live. It is a worrying situation, says Alex Diner of the North Kensington Law Centre, which offers free legal advice, as there is a well-established link between housing and mental health. "They face the most difficult housing situation imaginable," he says. With residents absent and a school beneath the tower

forced to move away from the neighbourhood, businesses are struggling, too. Of the 50 or so he is working with in the area, at least three have shut and four have moved away since the fire, says Allen Pluck of the Portobello Business Centre. "The place is a little bit like a ghost town." Many residents work in the gig economy, so lack the support and stability offered by salaried jobs.

In response to these circumstances, locals have turned to one another. Grenfell United, a community group, organises a monthly silent walk, which "provides a chance to reflect and remember in a dignified manner," says Natasha Elcock, who lived on the 11th floor. Religious establishments have provided support, and work together more closely than before the fire. The Al-Manaar mosque, a short walk from the tower, now runs children's holiday camps with the West London synagogue. Such is the sense of community, "People pop into the mosque like it's the pub," says one local (meaning it as a compliment).

But charities and community spirit can only do so much. NHS psychologists are studying the response to other disasters, including the Aberfan landslide in 1966 and the earthquake in Christchurch, New Zealand in 2011. Many people in the area knew someone who lived in Grenfell Tower, or had once lived there themselves, which made the fire "far more traumatic" than, say, a terrorist attack in a big city, explains Dr Green. People with PTSD often try to ignore their problems and do not seek support. So teams of nurses have gone door-to-door to assess residents for symptoms. Around 1,000 people have been treated for a mental-health problem, many referred by these outreach efforts. The number is expected to rise.

There is now a focus, among charities and the NHS, on reaching those unlikely to



### Success in football

## By their bootstraps

DAKAR AND MONTEVIDEO

**Wealth, size and interest in football explain almost half of countries' international performance. The rest can be taught**

ON A sunny Saturday afternoon, within kicking distance of Uruguay's national football stadium, 14 seven-year-olds walk onto a bumpy pitch. They are cheered by their parents, who are also the coaches, kit-washers and caterers. The match is one of hundreds played every weekend as part of Baby Football, a national scheme for children aged four to 13. Among the graduates are Luis Suárez and Edinson Cavani, two of the world's best strikers.

Messrs Suárez and Cavani are Uruguay's spearheads at the World Cup, which kicks off in Russia on June 14th. Bookmakers reckon *La Celeste* are ninth-favourites to win, for what would be the third time. Only Brazil, Germany and Italy have won more, even though Uruguay's population of 3.4m is less than Berlin's. Though it is no longer the giant that it was in the early 20th century, Uruguay still punches well above its weight. Messrs Suárez and Cavani reached the semi-finals in 2010 and secured a record 15th South American championship in 2011. Their faces adorn Montevideo's football museum, along with a century's worth of tattered shirts and gleaming trophies.

If tiny Uruguay can be so successful,

why not much larger or richer countries? That question appears to torment Xi Jinping, China's president, who wants his country to become a football superpower by 2050. His plan includes 20,000 new training centres, to go with the world's biggest academy in Guangzhou, which cost \$185m. The United Arab Emirates and Qatar have spent billions of dollars buying top European clubs, hoping to learn from them. Saudi Arabia is paying to send the Spanish league nine players. A former amateur footballer named Viktor Orban, who is now Hungary's autocratic prime minister, has splurged on stadiums that are rarely filled. So far these countries have little to show for their spending. China failed to qualify for this year's World Cup, and even lost 1-0 to Syria—a humiliation that provoked street protests.

### Footballer, meet model

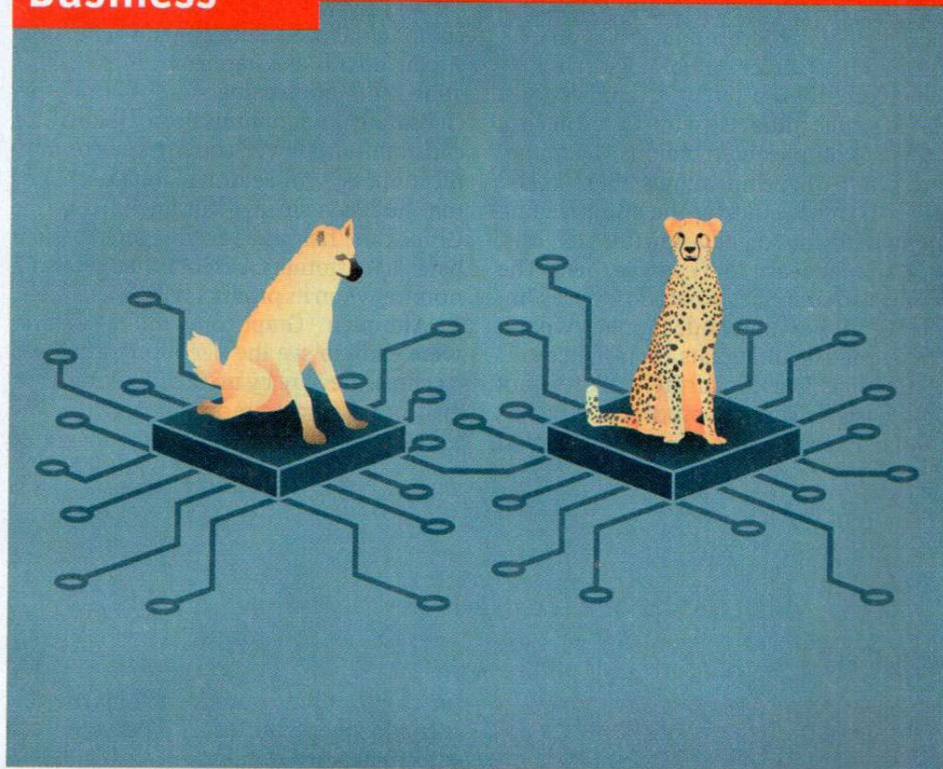
The Economist has built a statistical model to identify what makes a country good at football. Our aim is not to predict the winner in Russia, which can be done best by looking at a team's recent results or the calibre of its squad. Instead we want to discover the underlying sporting and economic

factors that determine a country's footballing potential—and to work out why some countries exceed expectations or improve rapidly. We take the results of all international games since 1990 and see which variables are correlated with the goal difference between teams.

We started with economics. Stefan Szymanski, an economist at the University of Michigan who has built a similar model, has shown that wealthier countries tend to be sportier. Football has plenty of rags-to-riches stars, but those who grow up in poor places face the greatest obstacles. In Senegal, coaches have to deworm and feed some players before they can train them; one official reckons only three places in the country have grass pitches. So we included GDP per head in our model.

Then we tried to gauge football's popularity. In 2006 FIFA, the sport's governing body, asked national federations to estimate the number of teams and players of any standard. We added population figures, to show the overall participation rate. We supplemented these guesses with more recent data: how often people searched for football on Google between 2004 and 2018, relative to other team sports such as rugby, cricket, American football, baseball, basketball and ice hockey. Football got 90% of Africa's attention compared with 20% in America and just 10% in cricket-loving South Asia. To capture national enthusiasm and spending on sports in general, we also included Olympic medals won per person.

Next we accounted for home advantage, which is worth about 0.6 goals per



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Chipmaking

# Hyenas and cheetahs

BRISTOL  
**Artificial intelligence has revived the semiconductor industry's animal spirits**

**S**UPERCOMPUTERS usually fill entire rooms. But the one on the fifth floor of an office building in the centre of Bristol fits in an average-sized drawer. Its 16 processors punch more than 1,600 teraflops, a measure of computer performance. This puts the machine among the world's 100 fastest, at least when solving certain artificial-intelligence (AI) applications, such as recognising speech and images.

The computer's processors, developed by Graphcore, a startup, are tangible proof that AI has made chipmaking exciting again. After decades of big firms such as America's Intel and Britain's ARM ruling the semiconductor industry, the insatiable demand for computing generated by AI has created an opening for newcomers. And it may even be big enough to allow some startups to establish themselves as big, independent firms.

New Street, a research firm, estimates that the market for AI chips could reach \$30bn by 2022. That would exceed the \$22bn of revenue that Intel is expected to earn this year from selling processors for server computers. It could swell further, argue the authors of a recent report by UBS, an investment bank. AI processors, they believe, will create their own demand; they allow firms to develop cleverer services and devices, which will collect even

more data, generating a need for even brainier chips.

To understand what is going on it helps to make a short detour into zoology. Broadly speaking, the world of processors is populated with two kinds of animal, explains Andrew Feldman, chief executive of Cerebras, an American competitor to Graphcore. One sort of chip resembles hyenas: they are generalists designed to tackle all kinds of computing problems, much as the hyenas eat all kinds of prey. The other type is like cheetahs: they are specialists which do one thing very well, such as hunting a

certain kind of gazelle.

For much of computing history, hyenas named "central processing units" (CPUs) have dominated the chip savannah. Becoming ever more powerful according to Moore's law, the rule that the performance of processors doubles every 18 months, they were able to gobble up computing tasks, or "workloads", in the jargon. This is largely why Intel, for instance, in the early 1990s became the world's biggest chipmaker and stayed that way for decades.

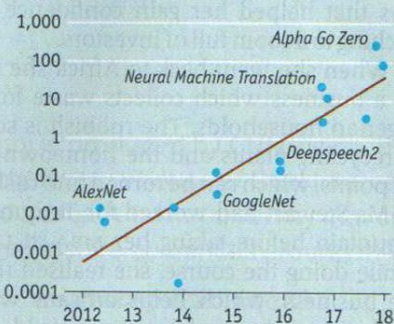
But in recent years the world of number-crunching has changed radically. Moore's law has started to peter out because making ever-denser chips has hit physical limits. More importantly, cloud computing has made it extremely cheap to amass huge amounts of data. Now more and more firms want to turn this asset into money with the help of AI, meaning distilling data to create offerings such as recognising faces, translating speech or predicting when machinery will break down.

Such trends have altered the chip-design habitat. First to benefit were "graphics processing units" (GPUs), a kind of hyena which are mainly made by Nvidia. Originally developed to speed up the graphics in video games, they are also good at digesting reams of data, which is a similar computational problem. But because they are insufficiently specialised, GPUs have been hitting the buffers, too. The demand for "compute", as geeks call processing power, for the largest AI projects has been doubling every 3.5 months since 2012, according to OpenAI, a non-profit research organisation (see chart). "Hardware has become the bottleneck," says Nigel Toon, the chief executive of Graphcore.

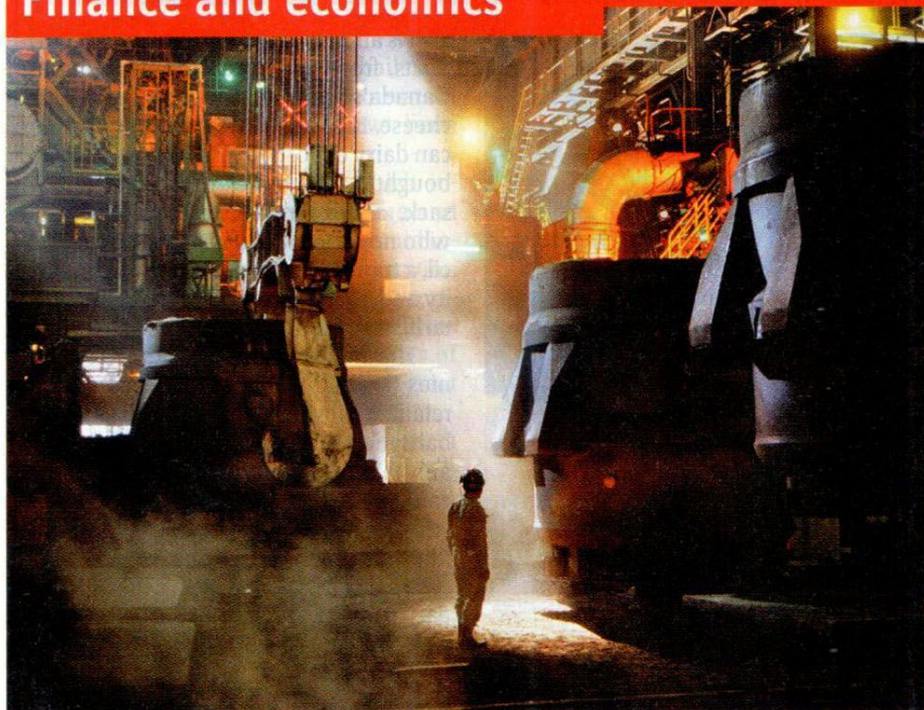
The response from various firms has ▶▶

### InsAItable appetite

Demand for cloud-based computing power  
 Largest AI projects, petaflops, log scale



Source: OpenAI



Trade wars (1)

# Friends and foes

WASHINGTON, DC

**Donald Trump's tariffs have united his opponents at home and abroad. First, the domestic and diplomatic costs; next, how retaliation hurts American exporters**

**H**OW am I going to compete?" asks Soheli Sareshwala. He runs Accu-Swiss, a Californian company making customised components for the manufacture of semiconductors and cars. President Donald Trump's tariffs on steel and aluminium, both of which he uses as inputs, are eating into his profit margins and delaying his orders. Meanwhile, Mr Sareshwala's competitors abroad, free of such concerns, can undercut him.

Mr Sareshwala is not alone in his frustration. On June 1st Mr Trump extended tariffs to countries that supplied 81% of America's steel imports and 96% of aluminium imports in 2017, arguing that this was necessary to protect national security. Tight quotas apply to most of the rest. Only Australia was let off, perhaps because of a friendship between the president and Greg Norman, an Australian golfer, who lobbied on his government's behalf. Mr Trump's tariffs and quotas have drawn a chorus of disapproval from American buyers of metal, the governments of Mexico, Canada and the European Union, and anyone concerned about the health of the rules-based system of world trade.

Plenty of business people besides Mr Sareshwala are finding that inputs are dearer and scarcer. Tariffs, imposed or threatened, have dulled foreign competition and pushed up the price of American-made metal. On June 5th hot-rolled steel

cost \$329 per tone more in America than in western Europe, according to data from S&P Global Platts, a price-benchmark provider. The gap for aluminium was \$290. The tariffs work like a tax, leading to more expensive bridges, pipelines, cars and beer cans. The quotas make planning nightmarish. When South Korea's were announced, some categories had already been filled.

Disquiet among the consumers of affected products is no surprise. More surprising is the resistance from those the tariffs are supposed to help. Though it at first supported tariffs, the United Steelworkers, a trade union, denounced them when they were unveiled because they included Can-

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ada, whose metalworkers happen to be members of the union too.

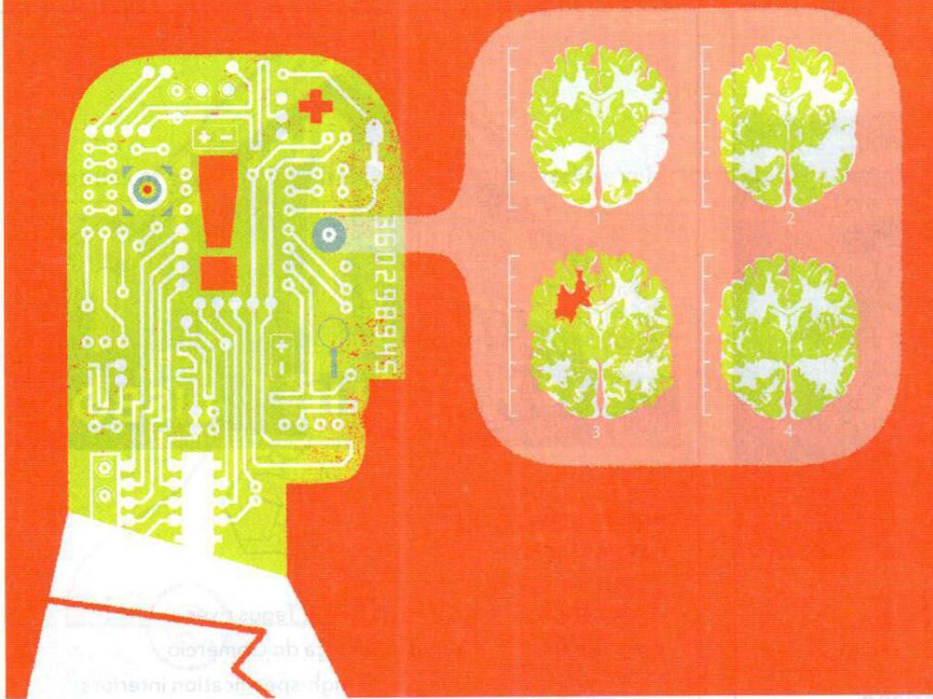
The Aluminum Association, an industry body, also weighed in. Its head, Heidi Brock, labelled Mr Trump's decision an "unfortunate outcome". Ms Brock had hoped that any measures would be aimed at tackling Chinese subsidies and overcapacity. Instead, because 97% of the American industry's jobs are in aluminium processing, and supply chains cross back and forth in North America, the tariffs are a headache for her members.

More pain is on the way. America's trading partners are promising tariff retaliation that could affect as much as \$43bn of its exports (see chart). They have picked products ranging from motorcycles to pork (see next article). Retaliation adds to worries that Mr Trump will harm America's economy not help it. Taking both his trade restrictions and retaliation by others into account, Joseph Francois, Laura Baughman and Daniel Anthony of the Trade Partnership, a consulting firm, estimate that for every job in steel and aluminium gained, 16 would be lost elsewhere.

Trade diplomacy is likely to be damaged, too. Mr Trump is supposedly still trying to renegotiate the North American Free-Trade Agreement (NAFTA) with Canada and Mexico. On June 5th Larry Kudlow, his economic adviser, insisted that the president was not planning to withdraw from it. But talks are stalled and Mr Trump's tariffs are diminishing the pact's value. NAFTA includes special conditions that its members must meet before attacking each other with tariffs; when President George W. Bush imposed broad steel tariffs in 2002, America's NAFTA partners were therefore spared. Mr Trump is doing his best to show that while he is in charge, such conditions count for little.







## Medicine

## From A&amp;E to AI

## Artificial intelligence will improve the speed and precision of medical treatments

FOUR years ago a woman in her early 30s was hit by a car in London. She needed emergency surgery to reduce the pressure on her brain. Her surgeon, Chris Mansi, remembers the operation going well. But she died, and Mr Mansi wanted to know why. He discovered that the problem had been a four-hour delay in getting her from the accident and emergency unit of the hospital where she was first brought, to the operating theatre in his own hospital. That, in turn, was the result of a delay in identifying, from medical scans of her head, that she had a large blood clot in her brain and was in need of immediate treatment. It is to try to avoid repetitions of this sort of delay that Mr Mansi has helped set up a firm called Viz.ai. The firm's purpose is to use machine learning, a form of artificial intelligence (AI), to tell those patients who need urgent attention from those who may safely wait, by analysing scans of their brains made on admission.

That idea is one among myriad projects now under way with the aim of using machine learning to transform how doctors deal with patients. Though diverse in detail, these projects have a common aim. This is to get the right patient to the right doctor at the right time.

In Viz.ai's case that is now happening. In February the firm received approval from regulators in the United States to sell

its software for the detection, from brain scans, of strokes caused by a blockage in a large blood vessel. The technology is being introduced into hospitals in America's "stroke belt"—the south-eastern part, in which strokes are unusually common. Erlanger Health System, in Tennessee, will turn on its Viz.ai system next week.

The potential benefits are great. As Tom Devlin, a stroke neurologist at Erlanger, observes, "We know we lose 2m brain cells every minute the clot is there." Yet the two therapies that can transform outcomes—clot-busting drugs and an operation called a thrombectomy—are rarely used because, by the time a stroke is diagnosed and a surgical team assembled, too much of a patient's brain has died. Viz.ai's technology should improve outcomes by identifying urgent cases, alerting on-call specialists and sending them the scans directly.

## The AIs have it

Another area ripe for AI's assistance is oncology. In February 2017 Andre Esteva of Stanford University and his colleagues used a set of almost 130,000 images to train some artificial-intelligence software to classify skin lesions. So trained, and tested against the opinions of 21 qualified dermatologists, the software could identify both the most common type of skin cancer (keratinocyte carcinoma), and the deadliest

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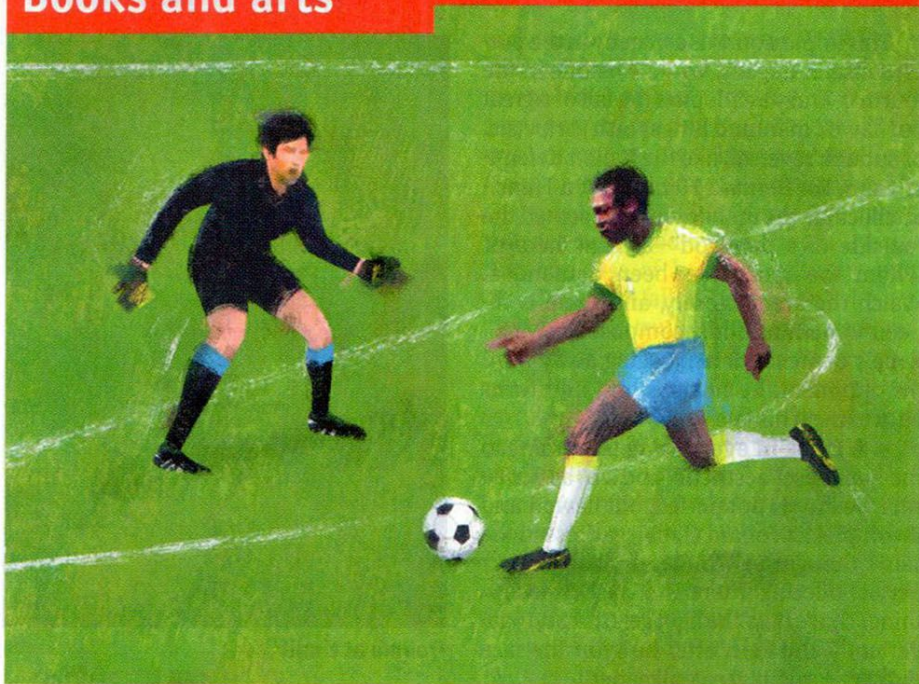
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type (malignant melanoma), as successfully as the professionals. That was impressive. But now, as described last month in a paper in the *Annals of Oncology*, there is an AI skin-cancer-detection system that can do better than most dermatologists. Holger Haenssle of the University of Heidelberg, in Germany, pitted an AI system against 58 dermatologists. The humans were able to identify 86.6% of skin cancers. The computer found 95%. It also misdiagnosed fewer benign moles as malignancies.

There has been progress in the detection of breast cancer, too. Last month Kheiron Medical Technologies, a firm in London, received news that a study it had commissioned had concluded that its software exceeded the officially required performance standard for radiologists screening for the disease. The firm says it will submit this study for publication when it has received European approval to use the AI—which it expects to happen soon.

This development looks important. Breast screening has saved many lives, but it leaves much to be desired. Overdiagnosis and overtreatment are common. Conversely, tumours are sometimes missed. In many countries such problems have led to scans being checked routinely by a second radiologist, which improves accuracy but adds to workloads. At a minimum Kheiron's system looks useful for a second opinion. As it improves, it may be able to grade women according to their risks of breast cancer and decide the best time for their next mammogram.

Efforts to use AI to improve diagnosis are under way in other parts of medicine, too. In eye disease, DeepMind, a London-based subsidiary of Alphabet, Google's parent company, has an AI that screens retinal scans for conditions such as glaucoma, ▶▶



### The art of football

## A beautiful game

The World Cup is a form of diplomacy and a secular religion. But sometimes football is also an art

PELÉ was nine years old when he first saw his father cry. It was 1950, the year of the *Maracanazo*—Brazil's devastating loss to Uruguay, at the Maracanã stadium in Rio, which cost the team the World Cup. The child promised his father that he would avenge the defeat. When the two countries next met in the tournament, in the semi-final of 1970, Pelé was playing. With the scores tied at 1-1, he chased a pass deep into Uruguay's half. The goalkeeper rushed from his line. Their foot race was also the climax of a story, or rather several: the story of the game, of Pelé's career, of his country's recovery from the *Maracanazo*.

With its mortifications and sense of worldwide communion, the World Cup—which begins on June 14th—is a kind of global religion. It is a form of soft diplomacy and a safe outlet for nationalism. For many fans, it is a potent quadrennial madeleine, each tournament summoning memories of previous ones, the lost friends with whom they were watched, past selves. Sometimes the football itself can be cagey and boring. But, especially on its biggest stage and canvas, sometimes football is art. Individual moves can be balletic, a team's routines exquisitely choreographed. Grand narratives unfold and crescendo, tragedies and unlikely triumphs that feature heroes, villains and occasionally players who contrive to be both.

**1. Darkness to light.** Redemption is one of the fundamental themes of art and liter-

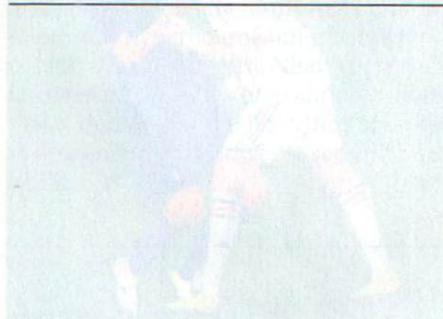
ature, from the Bible to the "Odyssey", from Raskolnikov's rebirth in "Crime and Punishment" to Rick's late-breaking idealism in "Casablanca". In such stories the good and bad that vie in people are heightened and set in conflict. Rarely have a character's base and noble traits collided as they did at the World Cup of 1986, in which Diego Maradona ascended from infamy to sublimity in a single game.

Not just any game. In 1982 Britain defeated Argentina in a war over the Falkland Islands. Four years later, having emerged from a military dictatorship, Argentina faced England in a quarter-final in Mexico. "We were defending our flag, the dead kids, the survivors," Maradona, the team's captain, said later. In the space of four minutes he scored the most scandalous goal in history and the finest. First he surreptitiously punched the ball into the net (the "hand of God", he called it afterwards). For the second goal, he seemed to function on a different plane to the hapless Englishmen. He pirouetted away from two defenders, ran half the length of the pitch, rounded the keeper and guided the ball home. Argentina won the game and, redemptively, the cup.

Before and afterwards, Maradona's life was chequered. He grew up in poverty; later he failed drug tests and ballooned. But, as he said in a memoir, "Nobody anywhere is ever going to forget those two goals I scored against the English." Togeth-

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er they form a diptych as dramatic as Scrooge's enlightenment or Darth Vader's conversion. The first "was like stealing from a thief". As for the second: "It is possible that a more beautiful goal has been scored...but I doubt it."

**2. Present at the creation.** Greatness in sport, as in art, often comes from unseen, grinding effort. But sometimes it arises from sheer inspiration—a wind awakening a coal to brightness, as Percy Bysshe Shelley put it, or the "flash in the brain" that Johan Cruyff said he experienced at the World Cup in Germany in 1974.

Cruyff was a master of flicks, feints, impudent shots and passes that described arcing lines of beauty. But it was his improvisation in a match against Sweden that made him immortal. By his own account, he had not practised what he did upon receiving the ball near the corner flag, a Swedish defender in close attendance. Cruyff appeared to be heading away from the goal, until, in a quicksilver feat of dexterity and imagination, he tucked the ball behind him, swivelled and set off in the other direction. For an instant he seemed to be running in both directions at once.

The "Cruyff turn" has since been attempted by players everywhere. Seeing it for the first time was akin to hearing the impossible, unscripted E-flat sung by Maria Callas at the end of "Aida" in Mexico City, or watching Michael Jackson unveil his moonwalk. When Cruyff died, one of the best tributes came from Jan Olsson, the defender he bamboozled. "I loved everything about this moment," Mr Olsson said. "I am very proud to have been there."

**3. Dust to dust.** In 2009 the artist Mark Wallinger curated an exhibition on the theme of boundaries and doubts. It contained *trompe l'oeil* paintings, artificial flowers and a fake Tardis, or perhaps a real one. Mr Wallinger called the show "The ▶▶