



BEHAVIOURAL FINANCE

THE INTANGIBLE ECONOMY

DIGITAL DETOX

WHY DEFICITS MATTER

THE FUTURE OF FIXED INCOME

AIQ

ISSUE 006



BEYOND THE CAVE

*Behavioural finance
meets data science*



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J39151-RA18/0651/01062019

Data: For better or worse?

Henrietta Lacks may not be a household name, but she is one of the most important figures in the history of medical science. During a biopsy procedure at Johns Hopkins Hospital in Baltimore in 1951, Lacks' cells were discovered to be 'immortal', meaning they can reproduce indefinitely. Long after her death, Lacks' cancer cells are still being used for crucial medical research – some of it for commercial purposes – even though she gave no consent and received no compensation.

The case highlights the opportunities and challenges surrounding the use of personal information. As with Lacks' cell line, data about our lives can be put to positive use. In our cover story on behavioural finance, we explore how vast datasets are being used by economists and policymakers to optimise transport networks and improve public health outcomes. At a micro level, data-driven methods can also help us identify our unconscious biases and make better financial decisions.

But the use of data also has a dark side, raising privacy and rights issues. Like Henrietta Lacks, many of us are unaware of how companies share and profit from our personal information. In an article on the 'digital detox', we examine the growing concern over how technology giants are harvesting data to become near-monopolies.

Led by the likes of Uber, Airbnb and Bodypump, we have entered into an era of 'capitalism without capital'. In this issue we explore what the rise of the intangible economy means for companies, markets and economies.

As AIQ went to press, trade tensions were escalating between the US and China. Under a Trump presidency, the viability of multilateral entities that have governed trade since World War II, including the World Trade Organization, are in question. The investment implications of this may be profound.

Fixed income also features prominently in this issue. In the post-financial crisis era, bond markets have been transformed as a result of regulatory change and the extraordinary policies of central banks. We take a crystal ball to predict how other factors, from technology to shifting flow dynamics, could help define a new era for fixed income. We also look at the long-term implications of ballooning government deficits, the risks and opportunities in frontier markets, and the folly of relying on bond benchmarks.

Other articles explore Abenomics, diversification, the case for a style-agnostic investment approach and the importance of covenants in the private asset universe.

We welcome your feedback, so please send any comments to me at the email address below.

I hope you enjoy the issue ●

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ALTERNATIVE HISTORY OF FINANCE: WHAT IF CHINA HAD NEVER JOINED THE WTO?

In a new column, *AIQ* imagines how hypothetical scenarios in finance and economics would play out. In this issue, we explore how the world would look if China had never joined the World Trade Organization.

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It is unfair to blame the growth of the US trade deficit solely on China

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In January this year, Robert Lighthizer, the US trade representative, put out a report stating unequivocally that the US had made a mistake in supporting China's entry into the World Trade Organization (WTO) in 2001. Lighthizer argued that China, together with Russia, had undermined the WTO by not trading fairly with other members of the organisation.

These comments were no mere words. In March, Donald Trump announced a series of tariffs on imports from China, a move that was rapidly followed by reciprocal tariffs from China on US goods. While talks between the two countries have since continued in an effort to prevent tensions escalating further, it's clear that under the Trump administration a fundamental principle of US trade policy has been reversed.

After decades of the US viewing membership of the WTO as a way to ensure better trading relations with China, the current government believes having China outside the organisation would make it easier to take action against what it claims are unfair practices, which have damaged US domestic manufacturing, led to widespread job losses and caused the US trade deficit to soar.

Reshaping the Chinese economy

The US can't turn back the clock to December 11, 2001 – at least not without abandoning the entire WTO framework. But let's consider what might have happened if US opposition had resulted in a rejection of China's application to join the WTO. This did not seem entirely implausible in the late 1990s, when the Clinton administration struggled to persuade Congress to back a deal. What would the Chinese, US and global economy look like if those efforts had failed?

The long process of China's WTO accession began in the 1980s, when it applied to join the General Agreement on Tariffs and Trade (GATT), the predecessor to the WTO. This process required the government to undertake a substantial number of economic reforms intended to open domestic markets to foreign firms.

These reforms had the effect of weakening the influence of the state-owned enterprises that previously dominated the Chinese economy and enabling the growth of private firms, which acquired greater freedom to participate in international trade. By the late 1990s, many of the domestic conditions that would drive the growth of the Chinese manufacturing sector were already in place.

Confirming the status quo

What's more, even before China joined the WTO, it had more or less the same access to the US market that WTO members enjoyed, under an annual waiver of a 1974 law intended to restrict trade with Communist countries – a waiver that had been passed by Congress every year since 1980. So WTO accession did not in practice immediately increase access to the US market for Chinese goods.

Still, because this waiver was subject to an annual review – which was sometimes controversial – there was always a risk the US could increase barriers on Chinese goods. This may have limited the extent to which US firms were willing to relocate manufacturing activity to China. Indeed, if the US trade deficit with China had begun to grow as rapidly under a scenario in which China was not a WTO member as it did in reality, it's quite possible Congress would have rejected the waiver or imposed additional conditions.

However, it is unfair to blame the growth of the US trade deficit and the decline of domestic manufacturing solely on China: both trends were well under way before



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Few would have benefited if China had not joined the WTO
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A cargo port in China

China joined the WTO. For example, the trade deficit grew from around two per cent in the mid-1990s to around four per cent by 2000, going on to peak at around six per cent in 2005.

It seems likely that even if the US raised additional barriers to Chinese imports, the trends we saw in US-China trade would simply have taken a different form. The most plausible alternative seems to be that more US manufacturing would have shifted instead to Mexico and to other Asian economies – most likely Southeast Asia, where currencies had collapsed against the dollar following the 1997 Asian financial crisis.

These destinations would have offered lower costs than US manufacturing. However, they did not offer the exceptionally-low costs, economies of scale and convenience that China's vast workforce offered. The result might therefore be similar growth in the US trade deficit and a decline in jobs – but without all the cost savings that China delivered. To put it bluntly: the US economy might have been worse off.

Undermining the WTO

Surely, however, China would also have been significantly worse off? That would depend on how the rest of the world reacted to the US decision.

Other nations supported China's accession to the WTO. If the US – the key supporter of liberalising global trade – had rejected it, the status of the WTO might have been weakened.

It is plausible other countries would then have sought to manage trading relationships with China outside the WTO. China's participation in global trade would probably have continued to grow, but in a different form: for example, we would have seen more exports of intermediate goods from China to Southeast Asian economies for completion and subsequent export to the US under WTO terms.

If the US still considered that China was following unfair trade policies, it could have attempted to persuade other countries to join it in taking wider action to limit China's involvement in global trade. However, if the US was perceived as having damaged the WTO – and the framework for resolving trade disputes – by excluding China from the organisation, it's not clear it would have enjoyed much support.

There is also little evidence that US administrations before Trump would have wanted to take action of this type. After all, in addition to the standard WTO dispute-resolution process, the terms of China's accession to the WTO provided the US with the ability to take action if Chinese

imports were shown to be disrupting US markets.

This provision, known as Section 421, was barely used: just one order, on tyre imports, was imposed by the Obama administration in 2009. If the US was unwilling to use options already at its disposal, it's difficult to imagine it would have implemented wider measures or persuaded other countries to join it in blocking China.

A poorer world without China

If China had not joined the WTO, the global economy today would undoubtedly look a little different. China would have probably grown more slowly, meaning fewer opportunities domestically and also for foreign investors in the country. Major importing economies might be worse off, due to higher costs and greater inefficiencies. But it seems plausible that many of the same imbalances would still exist.

The only obvious gains might have been for countries considered to be an alternative destination for export manufacturing over the past 15 years. In short, the global economy overall would probably have been a little poorer if China hadn't joined the WTO. Few would have benefitted – regardless of what the Trump administration appears to think ●

SUBSTANCE OVER STYLE? WHY AN AGNOSTIC APPROACH BEATS EQUITY STYLE BIASES



DAVID CUMMING
Chief Investment
Officer, Equities

Investors would be better served seeking opportunities from across the equity market than anchoring themselves to ideological style biases, argues David Cumming.

For active investors, it is important that their philosophy and processes are seen as effective and sustainable by clients. As the future is clearly not equal to the past, there is plenty of evidence that active equity investors can outperform if they have the correct processes.¹ The key is that they can effectively direct their resources to assessing what is changing and judging future outcomes better and more profitably than the obviously non-dynamic passive investors or backward-looking exchange-traded funds.

Investment-style biases are often used by managers to reinforce consultants' or clients' belief in their ability to achieve superior returns and differentiate themselves from other managers. Styles such as value, growth, quality or momentum tend to feature as process variations.

However, there are a number of problems with style biases. Most obviously, they restrict the pool of stocks you can own, and consequently your investment opportunities. In a world where a lot of investors are driven by macro rather than stock specifics, this can lead to style-biased investors fishing in a pool where growth stocks are overvalued while value stocks are cheap, or vice-versa due to an excessive focus on macro drivers such as currency movements or bond yields. Their philosophical constraints prevent them from investing elsewhere.

Style biases also leave portfolio managers at greater risk of smart beta challenge or tighter portfolio management hurdles. This is particularly the case where the approach is formulaic enough to be algorithmically expressed via a smart beta strategy, replacing a quality value strategy, or where their performance can be measured against benchmarks reflecting their factor biases.

Instead, we favour a style-agnostic approach. As active, stock-driven and future-focused equity investors, the best way to deliver for clients is not to constrain your investment opportunity set, nor your ability to respond to changing trends or information flows, both at the micro or macro level. This is especially relevant when competing against non-dynamic alternatives.

Style drift

A style-agnostic approach allows portfolios to simply follow the best fundamental stock opportunities, whatever the 'style' implications. This gives us the widest opportunity set to choose from and to have style 'drift' within portfolio construction. It also avoids the risk that macro factors may impinge on style performance at different points in the investment cycle.

Furthermore, being style agnostic leads to less factor or thematic volatility due to the sector biases inherent in various investment styles. Growth, for example, is often associated with being overweight technology. It should also diminish the risk of 'anchoring' – in other words, favouring one particular stock or sector. Changing portfolio exposures to a changing environment are allowed to be more dynamic under a style-agnostic philosophy.

Style-agnostic, idiosyncratic stock selection cannot be expressed by smart beta, ETFs or passive strategies, and its performance hurdle cannot be tightly

constrained. Also, style-agnostic portfolios will remain relevant throughout the cycle, with less client churn as the investment cycle progresses and style 'boxes' fall in and out of favour.

Intellectual shortcut

In conclusion, there are a lot of factors that have to be in place to encourage clients away from the passive option. Committed, well-resourced investment teams, a common investment approach, clear communication structures, efficient portfolio construction and the scale to directly access company management are all advantages. Having a style bias is not.

Style bias is simply an intellectual shortcut that restricts the opportunities created by market inefficiencies; a way of limiting your universe (and your workload).

However, if you have the analytical resources and organisational agility to cover the investment universe, you don't need shortcuts and can focus on first principles. Look for situations where company fundamentals are mispriced, and when these fundamentals transpire you make money. This flexibility offers a clearer and more efficient delivery of the truth that the future is not equal to the past, which is the nemesis of passive investing and 'smart' beta. Style biases simply get in the way ●

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Style bias is simply an intellectual shortcut that restricts opportunities

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1 KJM Cremers & A Petajisto 'How active is your fund manager?', *The Review of Financial Studies*, 2009 (probably the most cited study in this area)

THE GREAT



DIGITAL DETOX?

From Russian hackers interfering in foreign elections to high-profile corporate breaches, people are waking up to some harsh realities around data. We look at what the European call for a 'Magna Carta' for data has led to, and explore the investment implications of the growing scrutiny over data privacy.



THE GREAT DIGITAL DETOX?

continued

Tim Berners-Lee, accredited with founding the internet, has described himself as “an optimist standing at the top of a hill with the wind blowing in my face”.¹ And when the founder of the internet points out the challenges facing the openness of the worldwide web, it is wise to take note. His words reflect the recent groundswell of concern over online data privacy.

Built on a culture of openness, something embraced by the likes of Facebook and Google, the internet was later exploited for its imputed network effects. Now, from a point where large digital enablers enjoy almost monopolistic advantages, digital citizens are looking more closely at the trade-offs they are being asked to make online. On one hand, they benefit from the extraordinary convenience of free services, from messaging to maps. On the other, intensive tracking sustains the dominant business model, while free services are paid for in the form of users’ personal search and consumption data, collected year after year.

You get what you pay for

Essentially, these are barter-type arrangements that minimise direct costs to consumers, but allow tech companies to reach into personal lives in exchange. What might not have been immediately clear at the outset is the scale of the transaction – just how much information might be siphoned from a digital identity into the emerging data industry, and just how powerful the platform winners would become. At stake are vast caches of granular information that can be mined to inform new services, for directing content and differential pricing.

From today’s start point, trying to assess the true ‘value’ of digital services that the majority of users access ‘for free’ is quite a conundrum. Professor Erik Brynjolfsson’s Discrete Choice Experiments at Massachusetts Institute of Technology (MIT), where cash was offered in exchange for a digital good, suggested users would need around \$14 a month to give Facebook

a pass, but as much as \$500 for email and \$1,300 for search engines.² This suggests quite some appetite for convenience and interconnectedness.

Claiming space in a data world

Although the right to control the use of personal data lies with the individual under European law, carefully-worded terms and conditions have enabled wide-scale data gathering. Significantly, much of the data collated is not obtained from ‘first party’ sites. Online newspaper readers won’t be surprised to discover that a publication, whose website asked for and received their consent, knows exactly which pages were read. Much more surprising is the other, more granular information gathered by data harvesters. Recently, Princeton’s Web Transparency and Accountability Project found 80,000 third-party services collating information on the most commonly-visited websites worldwide.³ The majority of apps gather data which is fed to third parties as well.

Despite rules to protect personal information with a shield of anonymity – for example, by ‘scrubbing’ sensitive details or using numerical identifiers, not names – layering data from different sources is making it increasingly difficult to act incognito. In fact, it has been described as “laughable” to believe that one’s personal information cannot be traced, according to a member of the US Federal Communications Commission.⁴

This is important, because information is power. Data is an essential input in the information age, and there will inevitably be tensions between the rights of citizens and others interested in acquiring and analysing their information. Unwanted ‘reveals’ can have long-term implications for job seekers or borrowers, for example. Growing awareness of the erosion of privacy is problematic as well, inhibiting healthy debate that enables societies to change. Research suggests surveillance has

“*Research suggests surveillance has ‘chilling effects’*”

“chilling effects”, deterring people from exercising their rights – even when they are going about legal activities.⁵

As we look ahead, technologies embedded in everyday devices will mean a step change in the amount of information being generated. With the Internet of Things, the volume, velocity and variety of information recorded will surge. Some of the data will come from targeted information gathering, but there will also be dense layers that spill out as a side-effect of digital interactions. If a single UK start-up has 1.1 billion proximity sensors interacting with smartphones through commercial tie-ups,⁶ what is the scale of content that might be generated in the future?

A world defined by sensors and criss-crossed by GPS boundaries is always on, and suggests quite specific problems of privacy and data security. It also raises much bigger questions of power and system design – whose values are reflected, who is included and who will benefit in the future, according to Dr. Jathan Sadowski, a postdoctoral research fellow at the University of Sydney, in a yet-to-be published paper.⁷ “If we understand data as capital and a valuable asset, as a source of power, then it starts raising questions about extraction,” according to Sadowski. So, as private spaces shrink, where does this leave the rights of the citizen?

Privacy – an age-old problem

The idea of privacy is tricky, culturally relative and shape shifting. It is broadly agreed to mean the right to be left alone and free from unwanted intrusion. But what might be unwanted intrusion in some cultures is not the case in others. From talking about your pay to appearing in public unclothed, no two societies have the same level of comfort.

When the UN Declaration of Human Rights sought to establish shared ground rules in 1948, it set out the idea that no-one should be subject to “arbitrary interference” with their privacy, family and

Figure 1: Willingness to Trade Privacy for Convenience – A Global Index



Source: EMC



home, or in correspondence.⁸ In broad terms, that sentiment has been carried forward in law, although Europe has chosen to take a more robust stance on privacy protection than the US.

The world has moved on since 1948. Technology has become ubiquitous – in domestic life, the workplace and on the move. Anyone happy to share the minutiae of life in a blog, keep an open video-link to chat to friends and post selfies with embedded location data might think the concept of privacy old hat.

"People have really gotten comfortable not only sharing more information and different kinds, but more openly and with more people," said Mark Zuckerberg, CEO of Facebook, back in 2010. "That social norm is just something that has evolved."⁹

However, appetite for openness comes in many forms. In some countries, like Germany and France, there is less willingness to trade privacy for convenience (as shown in figure 1). In emerging markets like India, China and much of the Middle East, convenience seems to rank more highly.

Zuckerberg's relaxed view (which – significantly – the company now seems to be rowing back from) is not held by Professor Barry O'Sullivan, director of the Insight Centre for Data Analytics at University College, Cork. As data is an increasingly valuable currency for research and industry, he believes privacy and the

need to ensure age-appropriate content need much closer attention.

"We are moving into a world where people are concerned about privacy. They are concerned about the impact of technology on children. They are very worried about the wider impact of technology on societies. At the base of that, the thing that is enabling it is the sharing of personal data. And the technology doing it is doing it in a sneaky way."

Rebuilding trust in the data industry

'Sneakiness' is undermining; potentially troubling for researchers seeking to draw on troves of data to generate new insights in a Big Data age. Analysing swathes of information from large numbers of people might bring new insights to practical problems – in medical diagnostics, in managing the flows of patients in hospital admissions, in traffic and crowd control and so on. If confidence in the way in which data is collected or stored and protected breaks down, it could potentially limit enthusiasm to share information and scupper positive developments in the future.

"We are entering the 'Data Economy', in which data turns into value, after being processed by artificial intelligence, which has potential to create better outcomes," explains Jason Bohnet, head of technology, media and telecoms research at Aviva

Investors. "Users need confidence their data is being used in a reasonable and secure way. Otherwise, it will not really matter how good the offerings are, because ultimately they will get stymied. If we get too cynical and stymie data sharing and growth, we risk holding back transformational innovation. If we push too fast, with disregard for cyber security and civil liberties, we risk losing confidence in the data, which makes any results meaningless."

In terms of game theory, this is a classic Nash equilibrium problem. How will it be possible to create an optimal outcome for society, based on what the individual players might do? Some important suggestions have flowed out of the predicament, intended to rebalance interests in the data chain.

In the US, MIT Professor Alex Pentland has proposed a 'New Deal on Data', suggesting individuals should own their own data¹⁰ – far removed from the current US regime. In the UK, Berners-Lee's 'Magna Carta for Data' sought to crowd-source ideas to improve the nature of the web, ultimately reinforcing the idea established in 1215 that everyone should be subject to the law. It went on to inform the new EU General Data Protection Regulation (GDPR) that came into effect on May 25, one of the most significant changes in data privacy regulation for years.

THE GREAT DIGITAL DETOX?

continued

GDPR will apply to any business that handles personal data for European residents – their addresses, bank account details, web search histories and so on. Like Pentland's 'New Deal', at its heart is the idea control over personal data lies with the citizen. Under GDPR, data can only be harvested for specific purposes and not aggregated for incompatible projects. The individual retains the right to withdraw consent for use of their data and can request to be forgotten. The legislation includes a requirement for data keepers to maintain accurate records and keep information secure, and a clause covering the right to redress. Large-scale data breaches could prove costly; companies face fines of up to four per cent of annual turnover, a significant step up from current penalties.

For European regulators, GDPR is particularly important as it aims to establish a framework to future-proof and formalise requirements for the data economy. "The AI industry today is very much dominated by access to data," explains O'Sullivan. "GDPR is a piece of privacy legislation and a piece of data protection legislation, but I also see it as the world's first piece of AI legislation."

Privacy arbitrage

GDPR sits within a very specific ethical culture. If Europe is positioning itself at the conservative end of the scale in terms of personal-data treatment, China is placing itself towards the other. China monitors its citizens closely and comprehensively from birth, and it seems likely data will be used in its own bid to become a global leader in AI. "If one looks at ethical cultures – Europe versus the United States versus China – these are three very different cultures of how to use and access data," says O'Sullivan. "In the US, the company can own one's data. That's not the case in Europe. In Europe, control is always under the ownership of the individual."

O'Sullivan believes this could prove to be an important differentiator. "We have a very solid base for developing technologies that are privacy-preserving and protective of citizens' rights – more so than in the United States or China. I think there will be a market for privacy – a business model around privacy. Those three cultures will become key cogs in that industry."

Nevertheless, this remains a highly contested area. "What happens when you follow the European privacy model and take information out of the information economy?" asked US Republican Marsha Blackburn in 2010.¹¹ "Revenues fall, innovation stalls and you lose out to innovators who choose to work elsewhere."

GDPR has been portrayed as a burden to companies that fall under the EU regime, possibly putting the nail in the coffin of European businesses harnessing third-party data. An alternative view is that GDPR could encourage much higher standards of data management and a form of privacy arbitrage, where consumers choose service providers in one regime over another. It could also influence investment decisions, such as where companies locate their data centres.

For anyone concerned about online disclosures, the values driving privacy-protected search company MetaGer, a non-profit organisation spun out of Leibniz University in Germany, are clearly different to the dominant players. Its proposition includes no recording or storage of IP addresses or private data, and all of its servers are located in Germany.

So what might all this mean for the global incumbents? Firstly, regulatory risk is rising; even Zuckerberg has conceded more 'rules of the road' for Big Tech seem 'inevitable'.¹² Meanwhile, privacy concerns seem to be driving traffic towards companies whose strategies prioritise anonymity – hence the 55 per cent year-on-year growth for the search engine DuckDuckGo in 2017.¹³

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China is using data in its bid to become a global leader in AI

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However, the platforms whose business models have historically relied on tracking – like Facebook¹⁴ and Google's parent company Alphabet¹⁵ – are not reporting impacts from consumers turning away. In fact, quite the opposite – both reported markedly-higher revenue and profits in 2018.

"I don't think people will stop searching for things, using maps and translations," says Bohnet. "At this point, the digital infrastructure has become part of our everyday lives: I believe it is structurally here to stay." The calls for consumers to think about a 'digital detox' are perhaps not being heard.

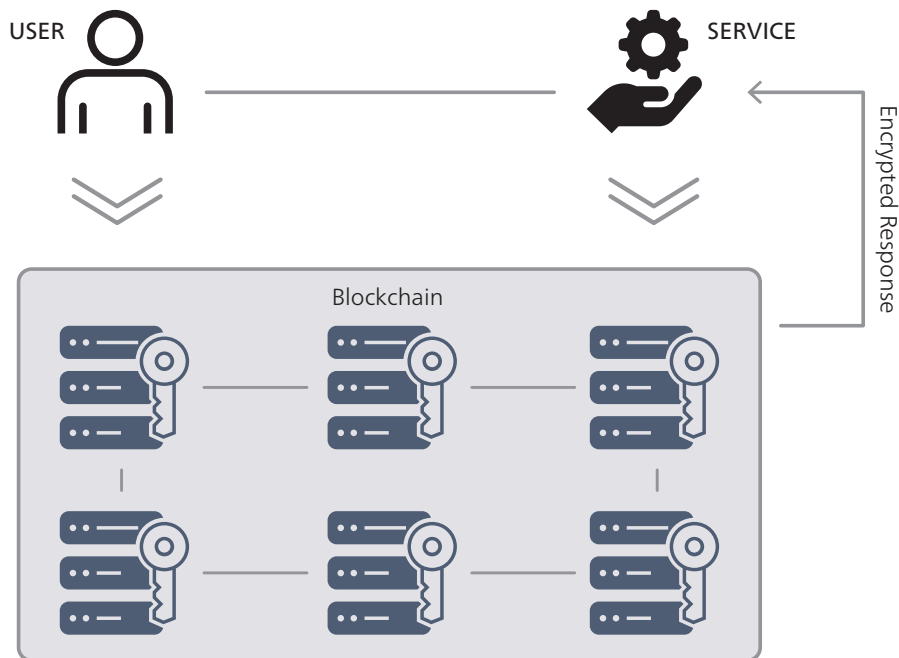
Putting the individual back in the value chain

With European moves afoot to reinforce respect for the ownership of personal data by the individual, the question that inevitably follows is "who might benefit?"

At the moment, the majority of value coming from the data harvested from billions of individuals is accruing to a relatively small number of companies, some with an iron-like grip on their platforms. While individual users have the benefit of online services 'for free', they are effectively sliced out of the value chain. Bruce Schneier, security expert and best-selling author, sees this model as "feudal".¹⁶ He likens it to tenant farmers who have the right to inhabit the digital space, but at a cost. Individuals have no rights to any further value that may accrue from those that aggregate and analyse 'their' data.

One way to reimagine the model would be to pay individuals for the right to access their information. This is exactly what sites like CitizenMe envisage, promising individuals and businesses a monetary award for revealing specific preferences and pieces of information. It is early days, but O'Sullivan believes broking personal information – with users giving their informed consent – could eventually morph into a whole new industry.

USING BLOCKCHAIN FOR DIGITAL PRIVACY



Source: Decentralizing Privacy: Using Blockchain to Protect Personal Data. 2015 IEEE CS Security and Privacy Workshops

Another option for those who want to break free of feudal-type data relationships is to opt out of free services, and 'pay-to-play' through subscription. Dedicated services like Netflix and Spotify show subscription-based services can work, although they are yet to be proven in search and social media.

Privacy: a killer application for blockchain?

Meanwhile, it is still not entirely clear how companies will deliver privacy and data security at scale. One possibility would be to use blockchain, the system of distributed ledgers. In theory, this has some obvious advantages; it would no longer be necessary for the users of online services to keep inputting sensitive information, such as their personal bank account details, into digital applications again and again. It would also cut the risk of a fundamental systems failure, as risk would be dispersed among the ranks of multiple ledger keepers.

The privacy and security conundrum has been engaging minds at MIT. Its specialists proposed using a protocol that might sit on top of existing blockchains. The idea was to use 'secret contracts' that could use data without ever

actually 'seeing' it. The researchers suggest this might make it possible for users to lock-in their own information, preventing it being monetised or analysed without their consent.

The clearest way to imagine this would be to think of a prospective user of a service whose personal information might be encrypted and locked into the shaded area shown in the chart above. When the user wished to access a service, a request to do that would be sent, assessed digitally (but not 'read'), and that query would generate an encrypted reply – so the service provider would never view the sensitive data itself.¹⁷

Somewhat ironically, the MIT project is called 'Enigma' ('riddle' in Greek), just like the cipher machine invented by the German engineer Arthur Scherbius. Breaking Enigma and cracking its code became the focus of Allied efforts in World War II – eventually carried out by agents in Poland and the UK. MIT's Enigma has been hacked too, shortly before the planned launch of a cryptocurrency in 2017.¹⁸

Nevertheless, there are still many who believe a role as a privacy enabler could

be transformative for blockchain – a killer application. "This is not just about making people's data private," explains O'Sullivan. "It's about the monetisation, trading and, crucially, protection of personal data." But the pathway for delivery is not yet clear.

Opportunities in an age of Big Data

The opportunities implied by the torrent of information being generated in a closely-connected digital world are immense. The information might give a fundamentally different and more granular level of understanding on what's happening, extending the boundaries of what we know. But there are a whole cluster of sensitive issues that need to be addressed before that point – ethics among them.

Companies that have aggressively followed 'grab-all' data strategies are fully aware of the value that might accrue to them, but their rights to do so are now being challenged. To extend Berners-Lee's analogy; note the wind, grab a coat and buckle up. Now's the time to do the thinking ●



THE GREAT DIGITAL DETOX?

continued



OPPORTUNITIES AND THREATS IN THE DATA ECONOMY

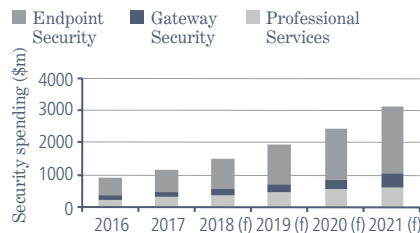
The immense scale of change in the technology industry is matched by interest in the potential investment implications. Tech trades helped drive markets in 2017, and seven of the world's 10 most valuable companies are technology stocks.

That being the case, it may be worth keeping an eye on valuations at a time when analysts are warning of a 'techlash'.¹⁹ From possible regulatory challenges to the accelerating use of ad blockers by millennials²⁰, there are reasons for caution in some areas.

Cybersecurity – an investment theme with a multi-year horizon?

Nevertheless, some investment themes may yet prove resilient over multi-year

Fig. 2: Strengthening information security: IoT spending forecast (\$m)



Source: Gartner, March 2018

timescales; one of these is cybersecurity. Consider the scale of the problem. It is fair to imagine there will always be bad actors who seek to exploit systems of any kind for potential points of vulnerability. In the past, that might mean a large corporate IT network with between 50,000 and 500,000 end points that need to be secured.²¹

The problem scales up considerably when technology is embedded in everyday objects. A single network might have millions or even tens of millions of end points. From each device to the power supply and heating and cooling systems embedded within a data centre, there are multiple locations from which disruptive actors can access the network. This is why IT research companies like Gartner are anticipating a strong step-up in security spending in the next few years. It could mean IoT-related spending almost tripling in scale by 2021.²²

One implication is that the companies taking effective steps to enhance controls and minimise cyber threats might be worth exploring as potential value generators. Not surprising, perhaps, that US-listed prime cybersecurity companies have significantly outperformed the NASDAQ in 2018.²³ ●

SCALING UP DATA INFRASTRUCTURE

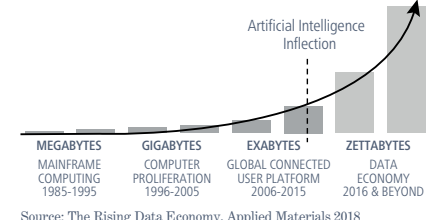
More applied technologies spilling out data creates practical problems; consider that a single self-drive car generates nearly one gigabyte of data per second.²⁴ So, although it is almost impossible to estimate how fast the uptake of new technologies will be, it is fair to assume there is likely to be more data and metadata to process in future. Indeed, it could well be the case that the amount of data being generated will be far greater than our ability to store it.

For example, it would take roughly 16 billion of today's largest 12 terabyte enterprise hard-disk drives to store the 163 zettabytes of data that might be created in a single year by 2025. To put that in perspective, the disk-drive industry has shipped less than four

zettabytes of capacity over the past two decades. A single exabyte – equivalent to storing all the words ever spoken throughout history – dwarves in comparison.

For investors seeking to take advantage of the scale of change, one possibility might be to explore companies making the memory chips to store or process code, or controlling other parts of the physical infrastructure that enable the transfer and storage of data. Some have high barriers to entry and comparatively-durable business models. Pairing the companies that control telecom towers and data centres with those that deliver the componentry for digital devices themselves would be one way to combine businesses with different risk profiles and relatively uncorrelated returns, while still sharing a growth bias.

Fig. 3: The Rising Data Economy



Source: The Rising Data Economy, Applied Materials 2018

Traffic routed through cloud data centres – which enable the remote delivery of IT applications and other resources – is expected to grow rapidly.²⁵ Given the expected volume growth in data moving between clouds, in copying content from one site to multiple data centres and streaming video, successful cloud operators could be strong cash generators. Conversely, the profitability of legacy hardware and traditional IT services companies may be challenged. ●

TO DETOX OR NOT TO DETOX?

Renewed scrutiny of the way in which social networks operate, of the psychological tools used to increase engagement and the methods of digital marketing, have led to calls for users to think more carefully about how much time they spend online.

From more extreme calls, like VR pioneer Jaron Lanier's 'Ten Arguments for Deleting Your Social Media Accounts Right Now', to more measured actions – the rules of engagement are under scrutiny.

So what do we know about the health impacts of using digital technology?

- Brain scans suggest internet usage does change the structure of the brain, according to research at UCLA's Memory and Aging Research Center. The impact can be positive, enhancing the parts of the brain used for cognitive processing. Changes can be seen in as little as a week in first-time internet users aged 55-78.²⁶
- However, there is evidence that young people whose attention is divided by using smartphones are less-effective learners.
- Having conversations without using mobile devices tends to result in higher levels of empathy.²⁷
- Higher usage of social networking sites has also been associated with depression and greater mood swings.²⁸ But the evidence seems mixed: a study of more than 120,000 UK adolescents in 2017 found no association between mental well-being and 'moderate' use of digital technology. There were measurable, 'albeit small' negative associations for people who had 'high levels' of engagement.²⁹
- One in three internet users worldwide is a child; algorithmically-selected content raises concerns about responsibility and agency.³⁰ ●



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IMMATERIAL WORLD: NAVIGATING THE INTANGIBLE ECONOMY

Investment in intangible assets such as data and design now outstrips that in physical things in many countries. But what does the rise of ‘capitalism without capital’ mean for companies, markets and economies?

Picture a gym. You’ll probably imagine a room cluttered with dumbbells, running machines and yoga mats: physical equipment designed to build physiques. But one of the most influential players in the gym industry owns hardly any physical things at all.

In the mid-1990s, Auckland-based Les Mills International created an exercise programme called Bodypump, consisting of intensive workout routines synched to music. The advent of cheap video technology enabled the company to expand rapidly, as the routines were filmed and distributed to instructors beyond New Zealand, who must complete an online course to obtain a license. Bodypump now has four million participants a week across 55 countries.

The value of this lucrative business lies in a mixture of intangible things: marketing savvy, intellectual-property rights, music-royalty agreements and a flair for high-tempo choreography. As a result, it has been able to grow in size and scale far more quickly than a traditional gym, which would need to stockpile more weights and cross-trainers to accommodate additional customers.

Bodypump is emblematic of a wider trend. Across different sectors and countries, companies are investing heavily in intangibles such as design, intellectual property and human capital. As digital platforms replace physical infrastructure, asset-light insurgents such as Uber and Airbnb are outmanoeuvring their rivals. Amazon, Facebook and other technology giants are harnessing the ephemeral forces of data and AI to grow at an unprecedented pace and scale.

This is not simply a story of digital disruption: the rise of the intangible economy has deeper implications.

At a macroeconomic level, it might explain such puzzles as slowing productivity and secular stagnation. The growth of intangible investment is also subverting the workings of markets by calling into question traditional measures of corporate value, creating new challenges and opportunities for investors.

All that is solid melts into air

According to some estimates, corporate investment in intangibles such as software, design, branding and research and development now outstrips investment in traditional assets in many advanced economies, including the US, the UK and much of Western Europe (see figure 1, overleaf).

In itself this is unremarkable. Changes in the nature of corporate investment have occurred repeatedly throughout history; think of railways supplanting canals or desktop computers replacing typewriters. What makes this latest transition significant, however, is that intangible assets are different from tangible ones in several fundamental ways. The most obvious is that they are difficult to reduce to figures on a spreadsheet: it is difficult to count something you can’t see.

Diane Coyle, a professor of public policy at the University of Cambridge, was one of the first experts to notice the trend towards intangible investment in the late 1990s, during the run-up to the Dotcom bubble. Her book *The Weightless World*, published in 1997, explored the difficulties in trying to quantify the economic contribution of companies focused on web-based services and design. Two decades on, this has become even more difficult in an era of machine learning, artificial intelligence and global data streams.

“We don’t have any good statistics on data – we know the volume of data being carried over networks is going up, but not what companies are doing with it or what they’re using it for. Emails might contain blueprints or just chit-chat. There’s a lot we don’t know in terms of the measurement of intangible assets,” says Coyle.

This problem is compounded by the fact many intangible assets are what economists would call ‘public goods’, in the sense they are more or less

inexhaustible. Because millions of people can access and use intangible assets at the same time, the question of ownership – especially intellectual-property rights – becomes difficult to settle.

Capitalism without capital

In their recent book *Capitalism without Capital*, Jonathan Haskel and Stian Westlake argue intangible assets have several other distinctive characteristics. They suggest these traits are prompting shifts in corporate behaviour and reshaping the deeper workings of economies.

“The shift to intangible investment matters because intangible assets have very different economic properties to tangible assets,” explains Haskel, a professor of economics at Imperial College London. “We call the economic properties ‘the four Ss’. The first is that intangible spending is often scalable. That is to say, if a taxi company wants to carry more passengers, it has to order more taxi-cabs; whereas if Uber wants to carry more passengers, it can simply scale up its software.”

Haskel says intangible assets are also ‘sunk’, which means they have little residual market value, making it difficult to recoup the investment. Consider Monarch Airlines, the British carrier that went bankrupt on October 7, 2017. Within a week, 10 of its 35 planes – its main physical assets – had been returned to lessors. By contrast, it took several months to resolve whether Monarch’s creditors would receive any money for its intangible assets, such as its rights to landing slots at UK airports.

Intangibles have two other key characteristics. They create spillovers that can be readily shared or copied by rival firms. But they also create synergies which in some cases encourage inter-firm cooperation or mergers.

“The MP3 protocol, combined with the miniaturized hard disk and Apple’s licensing agreements with record labels – along with its design skills – created the iPod,” Haskel says. “Tangible assets have synergies too – between the truck and the loading bay, say, or between a server and a router – but not on the same radical and unpredictable scale.”



IMMATERIAL WORLD

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Intangible assets help explain the defining trends of the past two decades

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Economic implications

The distinctive traits of intangible assets can help to explain many of the defining trends of the past two decades. Disruptors have risen to prominence by focusing their investments on enormously-scalable intangibles such as digital platforms, user networks and data flows. Spillovers mean design innovations quickly become widespread, which is why every smartphone now looks and feels more or less like a descendant of Apple's pioneering iPhone.

Companies' growing investment in intangible assets has made everyday life better in many ways: improving communication networks and furnishing consumers with free services. But the vast economic benefits that some had anticipated have not yet come to pass. Erik Brynjolfsson, a professor at the Massachusetts Institute of Technology and director of the Initiative on the Digital Economy at MIT, argues it is only a matter of time.

“There's a lot of pent-up innovation in areas like machine learning,” says Brynjolfsson. “What you see in laboratories is remarkable, but most of it hasn't really made its way out into the marketplace yet. That doesn't mean those benefits are not coming; I think they're in the pipeline. This is very common with fundamental technologies, going back to electricity or the steam engine. It can take literally years or decades before the full impact of investment in these core technologies happens in an economy.”

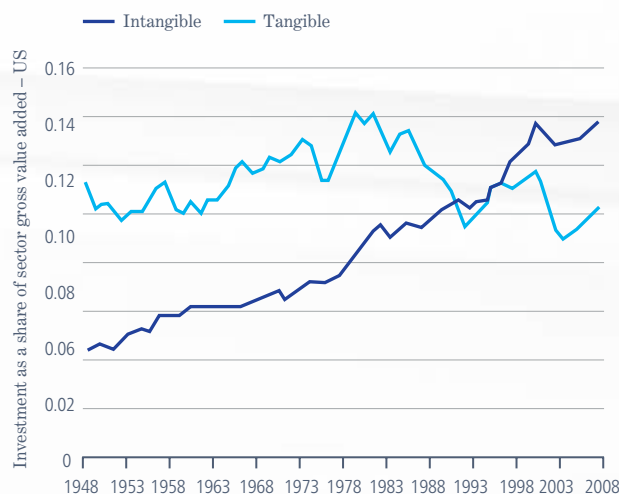
By contrast, Haskel and Westlake argue the peculiar characteristics of intangible assets may actually be causing economic harm. One issue is the dynamic between spillovers and synergies, which do not always cancel each other out. The bigger companies get, the more effectively they can take advantage of synergies and prevent the associated spillovers (such as by taking out costly protection on their intellectual property). This tends to enshrine the power of the leading firms and might explain the growing dominance of tech giants such as Apple and Google.

More troublingly, this trend may be contributing to stagnant productivity across advanced economies. If smaller companies are unable to bridge the gap to their larger competitors, they are likely to cut spending on new ideas and processes, and so overall corporate investment declines despite breakneck innovation among the leading or ‘frontier’ firms.¹ Haskel and Westlake point out this may necessitate increased government investment to take up the slack, especially when it comes to intangible assets that generate lots of spillovers, as firms may be wary of investing if they cannot be certain of reaping the benefits themselves.

GDP reform: a long time coming

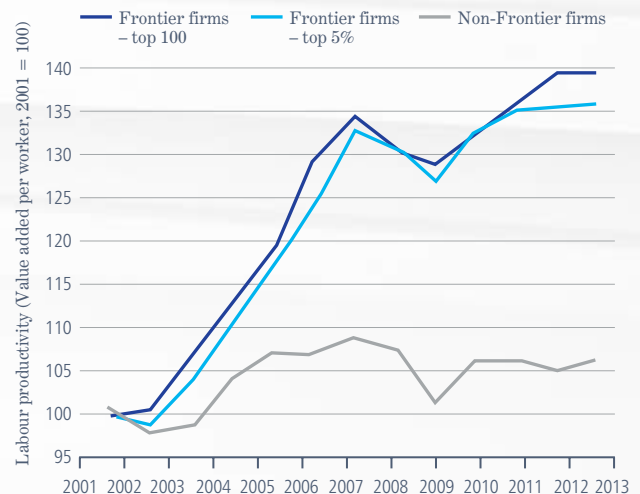
Part of the problem facing policymakers in the era of intangible assets is that they are not easily captured in traditional economic metrics such as gross domestic product (GDP). While some intangible investments are recorded in national

Figure 1: Intangible investment on the rise



Source: *Capitalism Without Capital*, Princeton University Press, 2017

Figure 2: Winner takes all: intangible investments and productivity



Source: *Capitalism Without Capital*, Princeton University Press, 2017

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Intangibles skew traditional measurements of corporate value

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accounts, such as software and databases and scientific R&D, many are not. This has led some to question whether GDP needs to be tweaked or even replaced as the primary index of economic health.

“If you are trying to value spending and income, GDP remains the most relevant statistic. But it is not perfect,” says Stewart Robertson, senior economist for the UK and Europe at Aviva Investors. “It is quite easy to measure the number of widgets coming out of a factory, but quantifying the economic value being produced by digital and creative industries is much more difficult. In an economy that is evolving in these directions, it is legitimate to ask whether GDP is still fit for purpose.”

The difficulty in measuring intangible assets can lead to a skewed sense of how an economy is performing, as some regions are more likely to benefit from digital and service industries than others. Cities with sectoral clusters will do well in an intangible economy, because they facilitate synergies, while rural areas will be left behind.

Both Coyle and Haskel argue GDP should be reformed to give a more holistic picture of how economies are faring amid the rise of intangibles. Haskel believes corporate investment in the design of new goods, services and processes, as well as the curation of big data and labour training, should be incorporated into national accounts.² Coyle, meanwhile, says GDP could eventually be replaced with a ‘dashboard’ of different metrics that show how easily individuals and companies can gain access to assets, including intangibles such as intellectual property and data (see boxed text, pp.18-19).

Financing the intangible economy

Investors face similar challenges to economists and policymakers in finding their bearings in the new intangible world. If intangible assets are largely invisible in

GDP figures, they are also rarely recorded in traditional corporate accounts, which skews measurements of corporate value.

It can be risky for banks or bond investors to lend to a company that relies on ‘sunk’ intangible assets that cannot be sold on in the event of a default. This lack of collateral is likely to mean traditional lending will make up less of the financing mix for intangible firms, or that lending will need to take innovative new forms. Governments in Singapore and Malaysia have begun working with the UK Intellectual Property Office and other organisations to subsidise bank loans against intellectual property, which may be one way to increase the availability of intangible-backed loans.³

For equity investors, the chief question becomes whether the elevated share prices of intangible-intensive companies such as the tech giants are justified, as they incorporate assets whose value it is difficult to measure precisely.

Take Netflix, a classic example of a company with a scalable platform. As of December 31, 2017, the firm owned property, plants and equipment worth \$319 million, according to its report and accounts – considerably less than its market capitalisation of almost \$150 billion. The bulk of the difference lies mostly in the company’s intangible assets – brand value, a content library, recurring subscriptions and vast stores of data on its billions of users.

Research recently published in the *Harvard Business Review* confirms S&P 500 companies with fewer physical assets are consistently showing much higher revenue multiples compared with those with lots of physical assets. Health technology had an average multiple of 5.1, while an asset-heavy industry such as consumer durables had a multiple of 1.3.⁴ These figures are even higher among the biggest technology companies: Amazon has traded on an average price/earnings ratio of 490.2 over the last five years, according to Morningstar figures.

Some have warned the soaring share prices of big tech firms – which, at time of writing, seemed to have resumed their upwards trajectory after Facebook’s data privacy scandal caused a wobble across the sector in early 2018 – are evidence of a new bubble. But given the continued secular shift towards intangible assets, these firms may have plenty more room to grow.

There may be a useful comparison to draw with the fate of the Nifty 50, the high-priced US growth stocks of the late 1960s and early 1970s. Despite high valuations at the time, Nifty 50 firms in healthcare and consumer staples – which spent heavily on R&D and were often light on tangible assets, like today’s big tech firms – tended to outperform the S&P 500 over the next 30 years (although many of them also de-rated viciously during the 1973-’74 bear market).

Research from Baruch Lev and Feng Gu shows technology companies’ investments in software and design are usually expensed when calculating earnings, while investments in physical assets are capitalised. While these investments might not be captured in a company’s report and accounts, they can pay off handsomely over the longer term, which may justify those elevated share prices.⁵

Investment implications

If a company’s financial accounts are no longer a useful guide to future earnings, how should investors respond? One possible solution would be to diversify among different companies in an intangible-intensive sector. This has the benefit of insulating a portfolio against the spillovers that can spread between tech-focused firms.

Another is to adopt a more focused approach, undertaking comprehensive research and analysis to go beyond the information available in an annual report and determine how a firm’s investments in intangibles are likely to bear on its prospects.



IMMATERIAL WORLD

continued

Jason Bohnet, head of technology, media and telecoms research at Aviva Investors in Chicago, cites Adobe Systems as a good example of a company whose investment in intangibles transformed its outlook. In 2010, Adobe stopped offering physical products to customers with a permanent license, and shifted to a more asset-light, cloud-based model driven by recurring subscriptions.

As well as conducting in-depth research into a company's intangible investments and business plans, Haskel and Westlake recommend focusing on its organisational structure and the quality of its leadership. For instance, they point out Amazon's tightly-coordinated organisational structure is proving particularly effective, allowing it to coordinate intangible investments and exploit synergies across business lines.

Ultimately, there are few hard and fast rules for navigating the intangible economy. The landscape is changing fast, and the old waypoints may no longer be a useful guide as apps, data-driven platforms and automated algorithms come to play an ever greater role in our lives. One thing is certain: there is no going back. For better or worse, we are living in an immaterial world ●

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- 1 See Haskel and Westlake, *Capitalism Without Capital* (2017). See also 'Are monopolies a danger to the United States?', Banque de France research note, February 2018
 - 2 See 'Improving GDP: demolishing, repointing or extending?' written by a team led by Haskel. The paper shared the 2017 Indigo Prize in economics with 'Making the future count', by Coyle and Benjamin Mitra-Kahn.
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MEASURING THE INTANGIBLE ECONOMY: AN INTERVIEW WITH DIANE COYLE

Professor Diane Coyle was among the pioneering economists who first started exploring the implications of the intangible economy in the late 1990s. Her book *The Weightless World* (1997) anticipated many of the consequences troubling policymakers two decades on, including rising inequality, the backlash against globalisation and the growing divide between cities and rural areas.



In her recent prize-winning paper, 'Making the Future Count', co-authored with Benjamin Mitra-Kahn, Coyle argues GDP should be amended to account properly for intangibles. Over the longer term, GDP could even be replaced altogether with a more useful 'dashboard' of metrics that track citizens' access to different assets, both tangible and intangible. Coyle argues this would provide a more comprehensive picture of a country's economic welfare.

In this Q&A, Coyle discusses the implications of the growth of the intangible economy and how policymakers and economists will need to adapt.

AIQ: It has been 20 years since you wrote *The Weightless World*. How has the intangible economy developed since then?

Diane Coyle: It has become a pretty well-embedded trend. It isn't that we've stopped being interested in stuff – we still have possessions and live in houses and so on. But the share of value in the economy that is intangible has clearly increased. You see that most dramatically in the stock market, where so much of company valuations now are intangible.

AIQ: Are those high valuations among the big technology companies skewing markets or economies in any significant way?

DC: It's complicated for a number of reasons. One is that we don't have very good data on what companies are doing and how to value intangible assets. For instance, we know that for any company, a lot of the market value is going to be bound up with goodwill or other intangibles. But that can evaporate overnight if there's some kind of scandal or crisis. Intangible assets have a 'fragility' compared to physical assets.

Second is that we don't have any good statistics on data – we know the volume of data being carried over networks is going up, but not what companies are doing with it or what they're using it for. Emails might contain blueprints or just chit-chat. There's a lot we don't know in terms of the measurement of intangible assets.

AIQ: Are there any other problems caused by intangible assets?

DC: The other problem is that they're what economists call public goods in the technical language: the fact one

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Intangible assets have a ‘fragility’ compared to physical assets

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person uses them doesn't stop another person using them. That refers to things that are literally provided by the public sector, like parks or national defence. But knowledge and ideas and other intangible assets also have this characteristic, in that lots of different people can use them at the same time. Now, we don't know how freely public goods ought to be distributed. That's one of the reasons intellectual property is such a fraught area, because the intellectual property rules for intangible assets have grown up by analogy with physical property, which means that value goes to a very small number of people who take out these patents.

AIQ: Does this mean regulators should step in to curb the power of the big tech companies?

DC: There are lots of examples of companies that dominate these winner-take-all markets for a certain amount of time and then get knocked off their perch by someone else. Myspace was replaced by Facebook, for example. There is a debate now as to whether the big four or five have got so big that this won't happen to them. Regulators are puzzling over what to do about that. I would argue they need to think about it in terms of allowing other competitors to get into the market: that could include looking at intellectual property rules to ensure patents are not too exclusionary; it might mean setting standards for data so that it can be transferred between different platforms. Those are the kind of rules I think regulators should be looking at, rather than more interventionist approaches.

AIQ: Much of the rhetoric around big technology companies that deal in intangibles is negative. You have argued that governments can learn from

them in their use of data and provision of services. Could you expand on this?

DC: People are writing about Uber replacing public transport in the US, but why couldn't public authorities copy them and do it themselves? There's nothing that says it has to be a venture capital-backed company that does this. Take social care. The demand for social care is going to grow enormously. It is much better and more efficient to look after people in their own homes. Why not create a platform that matches people in a certain area who can only work a few hours a week – because they need to take the kids to school or have other responsibilities – with people who need someone to come in and chat to them, cook them a meal. There's nothing to stop a local authority copying that model. Organisational change is much harder than buying a new computer – it's hard to change the way public bodies do things as it's a much more complicated environment than the private sector. But if people say data is the new oil, public authorities have lots of data, and they can use it for the public good. This new economy has lots of public good characteristics and we want it to benefit everybody.

AIQ: You have written widely on GDP and how it fails to properly measure the health of the modern economy. Could you explain this failure?

DC: There are two problems with the current approach. The first is that it doesn't pay any attention at all to sustainability, broadly understood, because it only looks at current consumption and current income, and not the extent to which we are consuming capital assets to maintain our standard of living. That's true of all assets, not just environmental ones. The other is the question of distribution.

We could do better in current statistics. If the ONS in the UK had put more resources into collecting regional and finer geographical statistics in the past, we would have known that some parts of the country simply haven't benefited from GDP growth for about 10 years or more; it was all very concentrated in the southeast. We think we are only measuring what we see, but in fact it's the other way around: we see what gets measured.

AIQ: How might we improve GDP as a metric to better measure the welfare of economies?

DC: We ought to pay attention to the distributional question even if we don't change the statistics. If we ask what are the sorts of assets people have access to, we would start to think about other things: What is the transport infrastructure available to people in areas of low income? What are the schools like; are they able to build up the human capital to give people the life chances they need? You can think about distribution in a much more empowering way if you have these kinds of figures.

AIQ: Are policymakers ready to give up their reliance on conventional GDP?

DC: There's a lot of interest in change at the moment. But it's a bit like having a technical standard, like driving on the left side of the road. Nobody is going to switch until anyone else switches. If politicians started saying GDP is not important, all the newspapers would say: "Well you're only saying that because it isn't growing." So there needs to be some kind of consensus and enough intellectual firepower behind switching to something else, as was the case when GDP was invented during the Second World War and immediately afterwards. The debate about what we would switch to is still going on ●

A CRUMBLING EMPIRE?

The global economic architecture built from the ruins of World War II is under threat, with US efforts to export its version of liberal democracy and free-market economics around the world on hold. What happens next is likely to have profound implications for the investment landscape, argues Michael Grady, senior economist and macro strategist at Aviva Investors.

"We are moving on with other nations to build an even stronger structure of international order and justice. We are ready to undertake new projects to strengthen a free world."

– US President Harry Truman at his inaugural address, January 1949.

In July 1944, delegates from 44 countries gathered in the Mount Washington Hotel in Bretton Woods, New Hampshire, to establish a new international economic order. The aim was to prevent a repeat of the breakdown of the international financial system of the 1930s, which led to the Great Depression and was one of the causes of World War II.

With protectionism, or so-called beggar-thy-neighbour policies, widely blamed for much of the economic mayhem witnessed during the inter-war years – in the five years to 1934 global trade plunged 66 per cent – signatories to the agreement promised their central banks would refrain from devaluing their currencies.¹

US hegemony

To support the drive for a new international economic order, Bretton Woods led to the

creation of three multinational institutions that were to form the backbone of a new global economic architecture. They were the International Bank for Reconstruction and Development, later to become The World Bank, the International Monetary Fund (IMF), and the General Agreement on Tariffs and Trade (GATT), the precursor to the World Trade Organisation (WTO). Their purpose was to ensure an orderly financial system and encourage trade and overall economic activity.

The World Bank was established to loan money to war-ravaged countries in western Europe, while the main objective of the IMF was to offer financial assistance to nations experiencing balance of payments difficulties, thereby helping ensure the stability of exchange-rate pegs. As for the GATT, its purpose was to promote international trade by reducing or eliminating trade barriers such as tariffs and quotas.

From the outset, the US, thanks to its economic might, and aided by the dollar becoming the world's de facto reserve currency, played a dominant role in all three multilateral institutions. As such, Bretton Woods helped establish US hegemony over world economic affairs. In doing so, it became a key

vehicle for the US, alongside its military prowess, to export its version of liberal democracy and free-market economics around the globe. The subsequent creation of other supervisory bodies, such as the G7 and Organisation for Economic Cooperation and Development, served to reinforce this rules-based world order.

This economic system helped to foster increasingly international markets for goods, services, capital and labour – a process that became known as 'globalisation'. In doing so, it arguably served the world well. Today's global economy is largely a product of the free markets that the US – and Bretton Woods institutions – promoted.



Cracks in the architecture?

In reality, the architecture as originally conceived began to be undermined as long ago as 1971. That was when US President Richard Nixon severed the link between the dollar and gold to stop foreigners, who were flush with dollars since the US had been running sizeable balance of payments deficits in the preceding years, from sapping US gold reserves.

With currencies suddenly freely floating, one of the IMF's main objectives – to maintain the fixed exchange-rate system by transferring capital from surplus to debtor countries – was redundant.

The World Bank's role has also changed radically since its inception in 1944. With the Marshall Plan going into effect three years later, the institution soon shifted its focus to loaning money to poorer nations for infrastructure projects, such as ports and power plants, as a means of promoting economic development and social progress.

During the 1980s, under pressure from Washington, the bank emphasized lending to service developing nations' debt that was often tied to demands for economic reform. Then, following harsh criticism from environmental groups among others, the bank in 1989 began including environmental factors when deciding to lend money.

Globalisation under threat

Despite these setbacks, the establishment of agreed-upon structures and rules of international economic interaction, meant conflicts over economic issues were minimized and the overall architecture was rarely called into question. However, with nationalism suddenly on the rise across much of the rest of the world as countries struggle to shake off the effects of the financial crisis, and with rising inequality and unprecedented migration flows further fuelling the angst, it is now under severe strain. Many are pondering whether the rules and institutions established at Bretton Woods can survive. And, if not, what will replace them. The answer is likely to have profound implications for the world and the investment landscape.

Leading G20 finance ministers in March tasked an independent group of experts with "delineating the challenges and

opportunities of a new era" of global governance. The group will report in October.

World leaders have already begun to put forward their visions for the future. French President Emmanuel Macron told US lawmakers in April: "We can build the 21st century world order based on a new breed of multilateralism, based on a more effective, accountable, and results-oriented multilateralism."²

At the same time, he implicitly acknowledged that would be impossible without the US, which having both created and been responsible for safeguarding multilateralism, was needed "more than ever" to build a new world order for the 21st century.

Unfortunately for Macron, in Donald Trump the US electorate in November 2016 voted in a president who scorns multilateral institutions such as the United Nations, appears to dislike dealing with other transnational bodies like the European Union, accuses US allies of not pulling their weight in NATO and walked away from the Paris climate accord.

What to do about the WTO

The WTO is bearing the brunt of the attacks from critics of globalisation, such as Trump, who called the organisation a "catastrophe".³ With Trump threatening to tear up international trade deals and undermine the WTO in other ways, whether or not the institution can be reformed in such a way as to retain its relevance will likely hold the key to globalisation's fate.

The WTO, and its forerunner the GATT, have played a central role in advancing the cause of trade liberalisation, in turn helping lift billions out of poverty. Beyond being the guardian for global rules, the WTO provides the forum for trade liberalisation, the writing of new rules and the settling of disputes.

Part of the WTO's problem is that it has made little progress since it was born out of a meeting of 124 ministers in Marrakesh, Morocco, in April 1994, marking the culmination of the so-called Uruguay Round of negotiations that lasted eight years. The subsequent Doha round, which began almost 17 years ago, largely stalled due to the refusal of the United States and

European Union to lower agricultural subsidies. The WTO's rulebook is now hopelessly out of date having preceded the advent of the internet and electronic commerce. That means adjudicators in the organisation's appellate court often have to apply evolutionary reasoning to outdated rules, attempting to compensate for the gaps in them.

Adding to concerns, Trump is blocking the appointment of judges to the court. That means the body's dispute-settlement mechanism could grind to a complete halt next year. The court, which is supposed to have seven judges, is set to be down to three later this year, the legal minimum it needs to pass judgements.

This prompted the WTO's director general, Robert Azevêdo, to warn recently the dispute system was a fundamental pillar of the organisation. Without it, members would very quickly start taking matters into their own hands, leading to a dangerous cycle of retaliation.

"The current situation is of grave concern. We need to find a solution quickly," he told *Politico*.⁴

Since Washington has not publicly explained its decision to block the appointment of judges, and has reportedly not linked it to any specific demands for reform, it is impossible to tell what Trump's ultimate objective is. However, given he is simultaneously threatening to spark a trade war with China, some fear his ultimate goal is to not only rip up the WTO's rule book but to kill the organisation off altogether.

According to one line of reasoning, Trump, who has said he is a fan of bilateral trade agreements, could be making a cynical calculation the US, with the world's biggest economy, can outmuscle any opponent in a trade dispute without the need for international arbitration.

Spaghetti junction

While much of the liberalisation of international trade during the 20th century happened under GATT's aegis, countries have in recent years turned to free trade agreements (FTAs) to access new markets.



A CRUMBLING EMPIRE?

continued

Today, the governance of multilateral trade is a far more complex affair than in the past; partly because of the emergence of these FTAs, but also because increasingly trade is not just about goods crossing borders but factories crossing them too.

However, according to a report published by the World Economic Forum in August 2015, even though rules governing the more complex cross-border flows involved in these so-called global value chains (GVCs) have been written outside the WTO, this offers little comfort.

The authors of the report, Richard Baldwin and Michitaka Nakatomi, argued the uncoordinated development of rules, by undermining the global rule of law, would hinder the development of GVCs too.⁵ In any case, Trump is not a fan of the FTAs that govern these value chains either. Having pulled the US out of the Trans-Pacific Partnership, he is currently renegotiating the North American Free Trade Agreement with Canada and Mexico.

As a result, Baldwin and Nakatomi warn the collapse of the WTO would likely result in a “spaghetti bowl” of rules and a re-emergence of raw power politics in trade relationships, with the rich and powerful discriminating against the weak. In a world that returns to the law of the jungle, it could be that Trump reckons he wins.

Sino-US relations

Somewhat ironically – given at the time it was widely seen as its crowning achievement – many of the threats to the WTO can be traced back to the admission of China in December 2001. While that decision has helped promote further increases in world trade, in the eyes of Trump and others it has enabled the country to gain access to foreign markets without opening up its own.

Washington and Beijing have in recent months exchanged a series of tit-for-tat restrictions on each other’s goods.⁶ The concern is that a trade war between the world’s two biggest economies could quickly escalate, dragging in other nations and spelling the end for the WTO.

For now, the betting appears to be that the two sides will see sense and manage to avoid an all-out trade conflict. Despite Trump’s protestations to the contrary, there are huge advantages to the US of having an open trading system, with US consumers having massively benefitted from the decline in traded goods prices. The US also arguably receives sizeable benefits from the dollar’s status as the world’s reserve currency, since it lowers interest rates by making it easier to attract capital from abroad.

US officials have even started to strike a

“*There is a widespread belief China will challenge the world economic rule book*”

conciliatory tone. For instance, Treasury Secretary Steven Mnuchin said the trade war with China was “on hold” after the two sides agreed to drop their tariff threat while they work on a wider trade agreement.⁷ Perhaps such voices of concern will grow louder as the White House starts consultations with different industries on its trade policies.

Interestingly, on May 11 Trump tweeted he had ordered Commerce Secretary Wilbur Ross to save Chinese telecoms group ZTE from collapse since it would cost too many jobs in China. Days earlier, the Chinese company said it would cease trading after the US announced punitive measures for its failure to comply with a settlement of charges for violating sanctions on Iran and North Korea. China demanded the Commerce Department ease restrictions.⁸

A challenge to the Bretton Woods system

Pressure on the global economic architecture is not only coming from richer nations such as the US. While ironically Trump has enabled Beijing to position itself as a champion of the liberal economic order, at the same time China’s emergence as a global economic superpower has encouraged it to challenge the Bretton Woods institutions that underpin that

THE FINANCIAL MARKET IMPLICATIONS OF A NEW WORLD ORDER

If the US were to retreat from global institutions and raise trade barriers, the near-term implications for financial markets would likely be considerable.

The complex inter-connected supply chains that have been erected in recent decades would likely be disrupted. That would impact a wide range of companies’ earnings and probably trigger sharp reductions in future investment. Costs to final consumers would also likely rise, both from the direct imposition of tariffs, as well as the second-round effects as companies incurred significant costs to restructure their businesses.

While rising protectionism would be bad for equities in general, the biggest losers would likely be emerging markets. Here, living standards have been steadily converging towards those in advanced countries in recent years thanks to the liberalisation of trade. That convergence could slow or even stop altogether, which would be negative for the price of other assets in these countries as

order. For instance, in January 2016, China launched the Asian Infrastructure Investment Bank (AIIB), widely seen as a rival to the World Bank, as a means of projecting its soft power. That China should be doing this is hardly surprising since it does not share the same commitment to the principles underlying these institutions, which it sees as extensions of US foreign policy.

Beijing has been aided in its task by a feeling that, despite the expansion of the G7 into the G20 in 2008, representation for emerging nations has not kept pace with their growing contribution to world economic output. For instance, although China accounted for nearly 15 per cent of world economic output in 2016, it held less than five per cent of voting shares in the World Bank. And while the OECD sets global standards in some areas, its membership comprises just 35 countries, most of them rich.

There is a widespread belief China will inevitably start to challenge this world economic rule book with greater force, and with it US hegemony.

"It is my personal view and shared by many people that they (China) are carrying out a well-orchestrated, well-executed, very patient, long-term strategy to replace the United States as the most powerful and influential nation on earth," senator Marco Rubio told a Congressional hearing in February.⁹

Chinese President Xi Jinping appeared to have admitted as much in 2017 when he revealed China planned to become the world's biggest superpower within 30 years.¹⁰ How the US responds to this challenge remains to be seen.

Thucydides Trap

In his 2017 book *Destined for War*, Harvard professor of government Graham Allison coined the phrase "Thucydides Trap" – a reference to the ancient Greek historian's observations about the war between Sparta and Athens in the fifth century BC – to describe the dangers of a period in which an established great power is challenged by a rising power.¹¹

"China and the United States are currently on a collision course for war – unless both parties take difficult and painful actions to avert it," he argued.

Allison's conclusions have been attacked by Arthur Waldron, a noted scholar of Chinese history and military affairs, who says the Chinese are "intelligent enough to realize that war – not to mention nuclear war – with the United States would be an insane action".¹²

Nevertheless, with two such pugnacious leaders as Trump and Xi at the helm, tensions between the two nations are unlikely to be defused quickly. Even when Trump's presidency comes to an end, demands for protectionism are unlikely to abate so long as large trade imbalances between the two nations persist.

Although a trade war makes little sense for Trump or Xi, the threat of one breaking out cannot be ruled out entirely given the fraught backdrop. That will keep the survival of the WTO, and with it the global economic architecture established at Bretton Woods, in doubt ●

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*Demands for
protectionism are
unlikely to abate*
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- 1 World Trade Organization World Trade Report: *Trends in international trade*, 2013
- 2 'Macron calls on US to embrace "strong multilateralism" to build a "21st Century world order"', *Washington Examiner*, April 2018
- 3 'Trump calls WTO a "catastrophe" amid criticism of trade deals', *The Telegraph*, February 2018
- 4 'Europe fears Trump is out to kill the World Trade Organization', *Politico*, March 2018
- 5 *Restoring WTO centrality to a multi-tiered global trading system*, World Economic Forum, August 2015
- 6 'Trump proposes \$100 billion in additional tariffs on Chinese products', *CNBC*, April 2018
- 7 'US, China putting trade war on hold, Treasury's Mnuchin says', *Reuters*, May 2018
- 8 'Trump vows to help sanctioned Chinese tech company, citing job losses', *Daily Intelligence*, May 2018
- 9 'China carrying out "patient, long-term strategy" to replace US as top global power, say American lawmakers', *Firstpost*, February 2018
- 10 'China reveals plan to become world's biggest superpower within 30 years', *The Independent*, October 2017
- 11 *Destined for War* by Graham Allison (2017)
- 12 'There is no Thucydides Trap', *SupChina*, June 2017

well. Euro zone and Japanese equities would likely be badly affected, given many companies' in these regions are heavily reliant on exports.

The US dollar may also be a casualty. Having enjoyed the 'exorbitant privilege' of being the world's reserve currency since World War II, a material change in the global monetary architecture could see it lose that status and become more vulnerable to the massive funding requirements resulting from the US's fiscal and current account deficits.

The impact on government bond yields would be less obvious. Rising protectionism could lead to stagflation, which would be challenging for central banks to respond to. The likelihood is that

monetary policy would be eased if central banks were prepared to overlook a short-term boost to inflation. For the US, where monetary policy is expected to continue to 'normalise' over the coming years, there would be more scope for yields to fall. On the other hand, increased uncertainty and volatility could also see 'term premia' rise sharply, offsetting any reappraisal in the monetary policy outlook.

At the start of this year, share prices fell sharply as tensions between the US and China ratcheted up. They have since recovered strongly as markets began to bet an all-out war would be avoided. However, with hostile exchanges likely to continue, markets could be in for a bumpy ride for some time yet ●

EVERYBODY WANTS TO RULE THE WORLD

As tech titans such as Google and Amazon attempt to conquer new markets and conglomerates continue to dominate in emerging economies, we look at the ingredients that determine whether diversification succeeds – or fails.

Throughout history, companies seeking growth have been allured by new geographical territories and sometimes even different industries. The old adage of 'diversify or die' has gained fresh resonance in the current age of disruption, with the fear of being marginalised from their area of expertise encouraging company boards to explore solutions in a different market.

Whatever the motivation, history tells us that radical change comes with significant risk. Indeed, 'diversify and die' could be just as apt a phrase given the high failure rate of many businesses that expand into new areas.

So is it possible for investors to gauge whether a company's venture into the unknown will meet with success or failure?

Larry Shulman of the Boston Consulting Group has been studying business diversification for 20 years and believes it is.

"Enterprises that undertake a project in a different industrial space, perhaps a new end market or geography, but understand the underlying economics and the type of business model required to prosper, have every prospect of success," he says.



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*The appeal of diversification
has waxed and waned across
Western economies*

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“However, companies that venture into sectors where the competitive forces differ fundamentally from their area of expertise have every chance of failing.”

Shulman cites Danaher Corporation of the US as an example of a successful, highly-diversified business. The company sells centrifuges, dental implants, fuel dispensers and water fillers to a wide variety of buyers. At first glance, these product lines appear unconnected.

However, Shulman argues there are many common factors that explain the company’s prosperity. “Prior to an aggressive move into life sciences, Danaher focused on industrial areas that require no advertising, and enjoy low sales and general administrative costs, but require considerable engineering expertise. I would argue life sciences is very similar.”

In other words, Danaher understands the competitive characteristics of the markets in which it invests. So while Danaher is a highly-diversified company, which enjoys a myriad of revenue streams from a wide variety of products and geographic areas, it can apply the same strategies and principles of operation across its interests.

Virgin territory

By contrast, Virgin’s attempt to break into the cola market in the 1990s is a prime example of a company failing to do its homework on the competitive forces driving a market. Sir Richard Branson’s analysis of Virgin’s failure also underscores how success in one industry can breed complacency that leads to failure in another.

“We felt confident that we could smash our way past Coca-Cola and Pepsi, our main competitors. It turned out, however, that we hadn’t thought things through. Declaring a soft drink war on Coke was madness,” recalled Branson in 2014. The key mistake, he acknowledged, was to ignore the reasons Virgin had succeeded elsewhere.

“Virgin only enters an industry when we think we can offer consumers something strikingly different that will disrupt the market, but there wasn’t really an opportunity to do that in the soft drinks sector,” said Branson. “People were already getting a product that they liked, at a price they were happy to pay – Virgin Cola just wasn’t different enough (even if we did create bottles shaped like Pamela Anderson that kept tipping over because they were top-heavy!).”¹

Back in fashion

The appeal of diversification has waxed and waned across Western economies. It reached its apogee in the ‘conglomerate boom’ of the 1960s, but fell out of favour from the late 1980s onwards. Diversification often resulted in the creation of corporate empires that lacked synergies and sapped management energy. However, a trend back to conglomerates may now be underway.

Even during its fallow years, Warren Buffett showed what can be achieved through diversification. Buffett’s Berkshire Hathaway directly owns dozens of businesses and holds large stakes in many more. Indeed, Buffett boasts that Berkshire “is now a sprawling conglomerate, constantly trying to sprawl further”. The ‘Sage of Omaha’ argues that the conglomerate structure, when used judiciously, is an ideal structure for maximizing long-term capital growth.

“At Berkshire, we can – without incurring taxes or much in the way of other costs – move huge sums from businesses that have limited opportunities for incremental investment to other sectors with greater promise. Moreover, we are free of historical biases created by a lifelong association with a given industry and are not subject to pressures from colleagues having a vested interest in maintaining the status quo. That’s important: If horses had controlled investment decisions, there would have been no auto industry.”²

Giles Parkinson, portfolio manager for global equities at Aviva Investors, believes a conglomerate can work well if the capital is allocated soundly within the business. He argues the ability to take money out of one industry and reinvest it in a completely different industry successfully is dependent on the quality of the people at the top.

“Conglomerates that have worked well in America and stood the test of time have been run by geniuses such as Warren Buffett. Henry Singleton, who built Teledyne into one of America’s most successful conglomerates in the 1960s, also had a brilliant mind; he could play chess blindfolded at just below the Grand Master level,” Parkinson says.

Advance of the tech giants

Technology companies such as Google, Tesla and Amazon are also driving the trend back to diversification. Shulman believes that, as with other companies, investors should focus on the basics of whether the technology titans understand the underlying economics of the businesses they are investing in.

Google, however, may be a unique case. “It has so much money and such a very long-term perspective on learning, information and data that it’s difficult to fathom whether it is brilliant or not,” Shulman explains.

EVERYBODY WANTS TO RULE THE WORLD

continued

The case is more clear-cut for the likes of Tesla, which is seeking to diversify away from its reliance on electric vehicles into areas such as mega batteries and solar power. "The Tesla car is basically a combination of moving batteries, and its new business lines are focused upon electric battery technology and the application of electrical systems," says Shulman. "The economics of making batteries is something that Tesla should understand. If it doesn't, its car business will fail!"

Elon Musk's SpaceX project shares similarities with the car business – a factor that should theoretically enhance its chance of success. Shulman argues the design principles used in building Tesla cars have been applied to the economics of building rockets.

Meanwhile, Shulman believes investors should view Amazon as an infrastructure company, which owns warehouses and fulfillment systems, server farms and server platforms, rather than as a retailer.

"Amazon Web Services, which provides cloud facilities; Amazon, the fulfillment company; and Amazon Prime, the streaming service, are all massive infrastructure plays, where a competitive edge is gained through scale and the leverage of that scale," says Shulman. "Jeff Bezos understood that making Amazon Prime a free delivery service

would cause short-term pain, but consumers would become accustomed to ordering all their goods ranging from books to groceries to clothes through the same portal, and that would provide a huge competitive advantage in the long term."

Preparing for the journey

"Stick to what you know" is the advice Lord Sugar gives to budding entrepreneurs. He learned this the hard way after buying Tottenham Hotspur Football Club in 1991, quickly realising he had made a mistake in entering a business he knew absolutely nothing about.³

Intuitively it makes sense to focus on expanding earnings from a familiar, existing business; whether via cross-selling or new platforms. It can, after all, take years to build up the knowledge and expertise required to

ASIAN CONGLOMERATES: KEEPING UP WITH THE TIMES

The conglomerate has long been a popular business model in the emerging world, stretching back to the trading houses of the British Empire, some of which – like Jardines – have endured to the present day. Since its foundation in Canton in 1832, Jardines has grown to employ around 444,000 people with interests that include real estate, auto sales and engineering across a number of Asian countries.⁴

Professor Christian Stadler of Warwick Business School believes there are a number of reasons that explain the appeal of conglomerates in the developing world. "Access to finance can be a major hurdle facing a small start-up with a smart idea, whereas a large company can draw on its own resources or existing contacts with banks," Stadler says.

The institutional environment is another factor. "In the West, problems between a company and its suppliers can be resolved via the legal process. That can prove very challenging in the emerging

world, so a company might decide it is better to integrate backwards in order to avoid dealing with suppliers entirely," adds Stadler.

Buying from a conglomerate also makes sense from the customer's perspective. "Consumers in emerging markets do not enjoy the same protection as their western counterparts: if you trust a brand in one sector, you might be inclined to trust it in another," Stadler adds.

Can the Asian model be copied?

While these factors may explain the origins of diverse business groups in emerging economies, K.S. Manikandan, associate professor at the Indian Institute of Management in Tiruchirappalli, Tamil Nadu, believes conglomerates have thrived due to their organisational structure.

In India and other emerging economies, explains Manikandan, businesses are often diversified at the group level but

Asia's corporate giants are adapting to external pressures to maintain their dominance.

individual units are separate, with their own board of directors who focus on their particular area of expertise.

Consequently, shareholders can pick and choose the parts of a conglomerate they want to invest in as individual units are listed separately. Manikandan uses the analogy of the tracking stocks that some US and UK firms offer when they operate multiple subsidiaries, whose value reflects the performance of a specific subsidiary rather than the group overall. This helps counter the main argument against diversification, namely that the lack of focus destroys shareholder value, asserts Manikandan.

In China, where conglomerates are less common, diversification also seems to work best when companies adopt a loose federated structure. Xiaoyu Liu, Asia equities portfolio manager at Aviva Investors, cites the example of Fosun International, which was founded in 1992 by five graduates and is managed like a private-equity firm.

succeed in any field of endeavour. Venturing into an unknown business area, where competitors are ready to pounce on any slip, is always risky. It is almost certainly getting harder too as regulations become more complex, technology more disruptive and skills more specialised.

Companies that do venture into new markets appear to do best when they enter areas where the competitive nature of the market is so similar to their existing field of endeavour that an already profitable business model is easily transferable. That is true across the world. Allowing managers with long experience in a particular industry the autonomy to make key business decisions appears another vital and universal ingredient.

Meanwhile, proper analysis of the financial returns expected can also help

determine whether diversification is worth pursuing, argues Trevor Green, UK equities fund manager at Aviva Investors. For example, hurdle rates, the minimum rate that a company can expect to earn when investing in a project, should be set materially higher for moves into fresh fields given the inherent risks involved.

Management should be able to clearly justify that diversification makes more sense than investing further in an existing business or returning money to shareholders. "If a company's leadership does give the green light to an acquisitive diversification, getting value for money is clearly the critical factor," argues Green.

With legacies on the line, management need to be sure it is a price worth paying ●

“*Diversification is almost certainly getting harder*”

- 1 'What to do when things go wrong', Virgin, December 2014
- 2 Berkshire Hathaway letter, February 2014
- 3 *The Unauthorised Guide to Doing Business the Alan Sugar Way*, 2010
- 4 'Jardines profile', Jardines, May 2018
- 5 'Tata Mistry saga nearing its end', *Bloomberg*, January 2018
- 6 'How Samsung dominates South Korea's economy', *CNN*, February 2017

"Fosun is run by Guo Guangchang, the chairman and one of the founders, and 30 global partners who tend to head individual assets such as the Club Med business," says Liu. "Below them are 450 investors who pitch deals that are assessed by an investment committee. One partner from the target industry and another from an unrelated sector sit on the committee."

Liu believes Fosun is successful because managers have autonomy to run individual units. "They invest in a relatively successful company and seek to improve it," she explains. Club Med is a good example of this strategy. The company, founded in Europe in 1950, specialises in all-inclusive holidays. Club Med's fortunes were in decline when Fosun acquired it in 2015, but profitability is now increasing as it focuses on China's fast-growing middle class, who are increasingly keen to holiday abroad.

Corporate governance: not an optional extra

Historically, the fortunes of Asian conglomerates have been tied to a dominant individual or family, who may not always have the interests of minority shareholders at heart. This has

frequently led to shareholder conflict in countries like India and South Korea, although Manikandan believes this is finally changing.

He cites the example of the Mahindra Group in India, whose interests range from autos to financial services, and which is now largely run by professional managers unconnected to the family that owns the business.

Recent events at Tata Group, which has over 100 operating companies and operations in a similar number of countries, further highlights this shift. The ousting of Cyrus Mistry as chairman in October 2016 eventually led to the appointment of a professional manager to head the business, with no family connections to the group.⁵

Corporate governance is also of increasing importance in South Korea, a country dominated by *chaebols* – industrial conglomerates that include world-famous names such as Samsung, Hyundai and LG.

Many South Koreans believe the immense wealth of the *chaebols* was accumulated at their expense and the authorities are coming under pressure to curb their power. Some are so large they are arguably too big to fail, while they may also smother

competition. The affiliated companies that make up Samsung, for example, account for around 20 per cent of the entire market value of the Korean Stock Exchange, and around 15 per cent of South Korea's entire economy.⁶

"The government is trying to reform the *chaebols* and make the shareholding structure much more transparent," says Ed Wiltshire, portfolio manager for emerging market and Asia Pacific equities at Aviva Investors.

Wiltshire believes the main problem with the *chaebols* is they are "organised to benefit the families that usually dominate them". They are generally composed of affiliated companies and the links are labyrinthine, mainly to ensure that the family has as much control as possible.

"As a foreign investor, you're always at a slight disadvantage, because even though these are very good, strong companies, they're not run entirely for the benefit of the average individual investor," Wiltshire argues. "However, the ownership structure is likely to be simplified and the owning family won't have as much control as in the past. This is encouraging for investors" ●

BEYOND THE CAVE



BEHAVIOURAL FINANCE MEETS DATA SCIENCE

Life used to be nasty, brutish and short. As hunter-gatherers out on the savannah 200,000 years ago, we were surrounded by mortal threats: ravenous beasts, raging heat, torrential storms. Safeguarding resources was key to survival. Spearing a gazelle for dinner meant quickly hauling it back to the cave before the local sabre-toothed cat took an interest.

In such a harsh environment, caution was an evolutionary advantage. The fear of loss became hard-wired into the brain. Other evolutionary quirks mean we experience the same stress responses when sitting in traffic and fretting about finances as we did when being chased by predators in prehistoric times: useful as a one-off, but corrosive when turned on chronically. What once helped us survive now threatens our health.

The idea primal emotions influence human choice and behaviour is nothing new. In the 1970s, pioneering psychologists Daniel Kahneman and Amos Tversky proved our decisions are often swayed by the neurological biases we inherited from our earliest ancestors. We get tired, stressed and distracted. We often lack self control and have a sense of fun, making our behaviour hard to pigeonhole into neat categories. By way of example, a shocking study in 2011 revealed judges dish out harsher sentences just before lunch.

Despite this, we are now in a far better position to do something about our failings as powerful data-driven technologies enable us to identify and correct for these errors. Informed by the latest neuroscience and empowered by new digital tools, economists are assembling vast empirical datasets and identifying irrational behaviours on a societal scale.

Drawing on these insights, policymakers are rolling out digital platforms to encourage citizens to improve their health and save for the future. In the finance industry, advisers are firing up high-tech risk-profiling tools to guide their clients through investment strategies, while asset managers are deploying computer programmes to 'de-bias' their portfolios and boost returns.

None of these methods is completely infallible, and an overreliance on computer models brings risks of its own. But used in the right way, digital technologies can spark us into awareness of the unexamined tendencies that shape behaviour – and allow us to transcend our all-too-human flaws.

Nudge, nudge; think, think

Start with the economics. Taking their cue from Adam Smith's *The Wealth of Nations* (1776), neoclassical economists long assumed people act according to a rational calculation of self-interest. While this assumption might make for useful explanatory models, it comes with a significant problem: it doesn't tally with how

The idea unconscious biases influence decision-making in financial markets is nothing new. But behavioural finance has taken on new relevance in the age of Big Data and artificial intelligence.

people actually behave. And, somewhat ironically, Smith was acutely aware of our human foibles; his earlier *Theory of Moral Sentiments* (1759) had roots in social psychology. Early 20th century heavyweight economists such as Thorstein Veblen and John Maynard Keynes also built behavioural aspects into the core of their thinking.

More recently, Kahneman's research has helped guide economics back to these early insights – showing that we think according to two different systems. 'Fast' thinking (also known as system one) is typically automatic, unconscious and swayed by physical or emotional responses, while 'slow' thought ('system two') is more logical and calculating. Our system two brains might kick in when we are working out a mathematical problem or reading poetry, but most of the time we act according to system one.¹

"Much of what we do every day we do in automatic mode," explains Hannah Lewis, founder of Behave London, a consulting firm that applies psychological insights in business and finance. "Running on automatic isn't necessarily always bad – most of the time it's perfectly helpful. Unfortunately, we're often running 'sub-optimal' behaviour. It can be difficult to change our automatic mode unless we experience some kind of disruption."

Kahneman's two-speed conception of human thought has its roots in the neurological structures of the brain, which have remained more or less constant since early *Homo sapiens* vied for supremacy with the Neanderthals. Because human beings' system one brains are much alike, we are governed by a common set of cognitive biases – or mental heuristics, in the psychological parlance – that lead us to behave in similar ways in similar situations. It follows that while human behaviour might be irrational, it is systematic and even predictable.

This insight forms the basis of behavioural economics, a discipline that has risen to prominence in recent years thanks largely to the work of Richard Thaler, a professor at the University of Chicago Booth School of Business. Because it relies on empirical observations about how people behave – rather than theoretical assumptions on how they ought to behave – behavioural economics opens up a whole range of practical applications that neoclassical models cannot reach.

Thaler has written several amiably witty books outlining these applications, but his key contribution can be summed up in a single word: 'nudge'.² He argues the framework within which individuals make decisions can be optimised to nudge them to recognise their biases and counteract them. Thaler has argued nudging will only become more effective as "powerful statistical tools and datasets" enable us to track people's behaviour with more precision.³

BEYOND
THE CAVE*continued***The digital nudge**

So it has proved. One of the most successful examples of Thaler's nudging principle is the automatic enrolment of employees into pension schemes in the US and the UK. Behavioural science shows people tend to favour short-term gains over longer-term prosperity. This bias may have worked for our hunter gatherer, who needed to concentrate on where his next meal was coming from. But it's a problem for a modern 30-something who urgently needs to start building their retirement pot.

By making it more difficult to opt out of pension schemes than it is to enrol on them, governments have been able to nudge savers into taking their future needs more seriously. In the US, automatic enrolment is estimated to have boosted annual savings rates by \$7.4 billion.⁴ Nudging techniques have also been used to encourage people to add loft insulation to their homes to reduce their energy bills, remind them to pay their tax bills on time and even donate their organs after they die.

But nudging is now being applied on a bigger scale. Alex Pentland, a professor at the Massachusetts Institute of Technology (MIT), has conducted cutting-edge research into how digital tools and psychological insights can be used to gain a picture of how people behave en masse. His work shows nudges and small incentives can be deployed at the level of whole communities – and even populations – to predict and optimise social behaviour. This is known as 'social physics'.

"The biggest limitation of [traditional] behavioural economics is that it is not systematic and holistic: it can't predict what will happen, only tell you some possibilities for how things can run off the rails," Pentland says. "That means you need a data-driven approach to understanding behaviour – for example, social physics – to keep track of what is actually happening versus what you suspect might be happening."

There is a dark side to the use of data to manipulate social behaviour – witness the Russian government's deployment of cyber-propaganda techniques to disseminate political messages on social media. However, the combination of data-crunching tools and behavioural expertise has many positive implications for public life; from the provision of healthcare to the management of transport infrastructure.

For example, the San Francisco Mass Transit Authority successfully eased transport congestion on its network by using large-scale GPS data to track and predict people's movements. By designing smartphone apps to nudge commuters using mobile games and monetary incentives, the authority was able to make the entire system more efficient.⁵

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The combination of digital tools and behavioural expertise has positive implications

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Financial behaviour

Even as behavioural economics entered the mainstream and began to influence government policy, one industry was curiously slow to recognise its significance: finance. This was partly due to a long-held assumption financial markets provide sufficient incentives for investors to behave rationally, making emotion and bias irrelevant. As Thaler once quipped, if some financial professionals do something stupid, there are plenty of others willing to take their money.

This conviction underpinned the efficient market hypothesis (EMH); the idea market pricing always incorporates the relevant available information, rendering the hunt for undervalued stocks futile. The global financial crisis of 2008-'09 was a salutary reminder of how irrational behaviour can drive market swings.

The ensuing turmoil exposed financial institutions' overreliance on quantitative risk models based on mathematical probability, including Value-at-Risk (VaR), which plots a bell-shaped range of possible outcomes. Such metrics failed to account for the ways investors behave under pressure, says George Lagarias, senior economist at Mazars Wealth Management.

"There were two axioms by which we used to work prior to the financial crisis. One was that investors are inherently rational. The other was that, if you have enough data, markets will tend to show a 'normal' distribution of outcomes. Both of these axioms were tested and promptly rejected during the financial crisis. And if the models are failing, this shows you need to look at investor behaviour."

More specifically, the fallout from the crisis focused attention on the biases that drive financial decisions. More than 170 individual cognitive biases have been identified. 'Herdning' denotes the tendency for investors to copy each other's strategies even as asset bubbles form, while 'loss aversion' leads them to do whatever it takes to avoid the psychological pain of losing, including taking big risks to dig themselves out of negative positions (see 'Bias in Action', opposite).

New data-driven tools can be used to identify the operation of bias at a macro level, which could help prevent future crises. Conducting experiments on an online trading platform, Pentland's team at MIT was able to identify incipient herd behaviour as it developed; by tweaking the flow of information investors received, he led them to adjust their strategies and prevented bubbles from forming.⁶ Regulators are already beginning to create supervisory technology (or 'SupTech'), which uses machine learning to monitor financial stability in a similar way.⁷

Institutional bias

The fear of loss can also play out at an organisational level. Research from the International Monetary Fund (IMF) shows institutional investors such as sovereign wealth funds, pension schemes and insurers acted pro-cyclically during the financial crisis.⁸ Some investors

BIAS IN ACTION:

THE EFFECTS OF LOSS AVERSION IN FINANCE

were able to successfully exploit their risk tolerance, but many were driven by loss aversion to reduce risk at the wrong time, despite their long investment horizons.

If irrational behaviour can explain hasty decisions, it may also account for damaging institutional lethargy. For example, pension fund trustees have in some cases shown a reluctance to hedge a greater proportion of scheme liabilities, even if that would be the most appropriate course of action, because doing so would mean capitulating on previous market calls, and accepting they were wrong.

"If you have lived with a view that yields are too low and expressed that view by not fully hedging, it is awfully hard to change that view now," says John Dewey, head of investment strategy in Aviva Investors' solutions function. "It can also be more comfortable for pension trustees to stick with an existing strategy rather than undertake a more appropriate strategy that may in retrospect perform worse and be attributed to those individuals. Loss aversion and individual career risk play a part, as does a reluctance for large changes (anchoring and familiarity bias), and irrelevant comparisons to peers (herding)."

Similarities abound in the insurance market, as Iain Forrester, head of insurance investment strategy at Aviva Investors, explains. "Behavioural issues have contributed to the apparent reluctance of insurers to diversify into new assets," he says. "Status quo and familiarity biases in their asset allocations, exacerbated by regulatory considerations, are leading to conservatism, resulting in insurers achieving sub-optimal outcomes with their capital."

Nudging for advisers

At a micro level, digital tools can be used to make investors aware of their biases before they buy or sell securities, nudging them to focus on how their desired outcomes might be achieved. The financial advice industry is leading the way in this area. Advisory firms have devised innovative 'risk profiling' platforms that can map individual investors' personalities, quantify their risk capacity and highlight their unconscious biases.

"There are three aspects to this: digital, data and design," explains Greg Davies, head of behavioural finance at Oxford Risk, a company specialising in behavioural software to help people make better financial decisions. "Think of it as a Venn diagram: you have digital platforms as a mechanism for delivery of information; data that can enable you to personalise what you put in front of clients through the digital channel; and a design that makes the platform comfortable and easy to use. Then you have behavioural science at the centre to pull all of these elements together."

Behavioural finance has its roots in the pioneering work of the psychologists Daniel Kahneman and Amos Tversky in the 1970s, who uncovered how unconscious biases skew our decisions. One of their key discoveries was something they termed loss aversion: simply put, people hate losing more than they enjoy winning, and this leads them to behave irrationally under certain conditions.

Herish Shefrin, professor of finance at Santa Clara University, was among the first academics to conduct in-depth research into the financial implications of this tendency. In a landmark 1985 study, Shefrin and his colleague Meir Statman found equity investors are too quick to sell stocks that are rising in value, even as they hold on to those that are falling. They termed it the 'disposition effect'.

"The disposition effect relates to investors' predisposition to sell winners too quickly and hold losers too long, relative to value maximizing behaviour," Shefrin says. "Our brains possess reward centres, areas that feature dopamine activity that lead us to feel good, sometimes euphoric. Selling stock at a gain stimulates our reward centres, thereby producing the feeling of being a winner. Conversely, selling stock at a loss activates different areas in the brain, areas that are associated with pain."

Investors' fear of loss may explain some of the financial markets' most intractable puzzles. For example, equities have offered an average premium of six per cent over government bonds over the last century or so, even though equity investors would have needed less than one per cent to compensate for the increased risk in the asset class.

After exhaustively studying this conundrum, Richard Thaler hit upon an explanation: equity investors demand greater returns because they are discomfited by the inevitable volatility of stocks. Equity investors who checked the performance of their portfolios on a regular basis were especially likely to insist they needed higher returns, probably because they were reminding themselves how painful losing money really is.¹³

The fear of loss is not simply an issue for individuals: it can also play out at an organisational level. Research from the International Monetary Fund (IMF) shows institutional investors such as pension funds and insurers acted pro-cyclically during the financial crisis, exacerbating wider market volatility. Some investors were able to successfully exploit their risk tolerance, but many were driven by loss aversion to reduce risk at the wrong time, despite their long investment horizons.¹⁴ ●

BEYOND THE CAVE

continued

These platforms are not infallible, and no one has yet devised a model that would correct all behavioural errors. Nevertheless, the enormous power of these digital tools raises a potential problem with nudging: its inherent paternalism. Thaler prefers the phrase 'libertarian paternalism' – which emphasises the scope for freedom of choice – but in practice nudging requires no active engagement from the nudgee. The risk is that non-professional investors are nudged by algorithms into making decisions whose implications they only dimly understand.

Davies argues the true potential of computer-based financial platforms lies in giving people the information they need to make informed and conscious choices, not in the kind of automated machine operations that eliminate the role of flesh-and-blood human beings. Properly designed, digital tools can incorporate nudging methods alongside other protocols to ensure clients are engaged, educated and aware of the true complexity of financial decisions.

These methods include 'gamification' techniques, or game-like elements that encourage people to engage and learn comfortably in complex environments. As Jeremy Leadsom, head of UK wholesale at Aviva Investors, puts it: "The great thing here is that technology is being used as an enabler and enhancer to the advisory process and experience. Real-time data can be combined with behaviourally-informed risk profiles to offer up effective prompts at key points in clients' lives. What's more, the frequency and tone of communications can be tailored to best meet a client's disposition and preferences."

De-biasing in asset management

Nudging is also on the rise among professional investors, with the asset management industry waking up to the potential of behavioural science. As with individual investors, the most effective methods do not use machines to take matters out of human hands; rather, they nudge investors into awareness of their biases so they avoid costly mistakes.

Gulnur Muradoglu, professor of finance at Queen Mary University of London and director of the Behavioural Finance Working Group, says the key to successful nudging in asset management is to identify and target particular irrational behaviours to prevent them from reoccurring.

"There are some asset management companies that do this sort of training with their fund managers, but it has to be specific about your actions [to work]," she says. "Fund managers can be encouraged to check their previous forecasts on a timely basis, so they are not under the illusion they are right every time. That will help them calibrate themselves better, and have more realistic expectations about the future."

Digital nudging techniques are being used to 'de-bias' specific behaviours in this way. In a recent research paper, consulting firm

“*Digital nudging techniques
are being used to 'de-bias'
financial behaviours*”

McKinsey & Co. described an approach known as 'de-biasing', which it estimates could lead to improvements of fund performance of between 100 and 300 basis points per year among asset managers.⁹

The process begins with the deployment of data analytics software to undertake performance decomposition, which indicates how certain types of decisions (stock selection, the timing of asset purchases or sales) have contributed to or detracted from historic returns. The results are combined with findings gathered from detailed psychometric questionnaires that pick up on the emotional and environmental factors that influence fund managers' decisions.

The nature of the nudge will depend on the bias identified through these methods. 'Visual nudging' uses fund managers' software to automatically present them with alternative metrics about the structural environment – such as analysts' upgrades or price performance relative to other stocks in the sector – they might not have considered. Visual nudging has been found to be particularly effective in addressing an error known as 'anchoring', a tendency to base or 'anchor' decisions on illogical reference points.

Giles Parkinson, global equities fund manager at Aviva Investors, uses a visual nudge known as 'clean-sheet redesign' to help him avoid this pitfall. "One common tendency among investors is to anchor their thinking to the price they paid for a stock. They might have paid \$100; if it falls to \$80, they might hold on to it for too long in the hope that it will rise back to the original level. This is totally irrational," he says.

"By disabling the book-cost display on the reporting software, which would otherwise provide a constant reminder of the amount I paid for a particular stock, I ensure I am continually reappraising the portfolio with fresh eyes. It's a way of asking myself: 'If I was starting from scratch, would I own this stock?' It's good mental discipline," Parkinson adds.

Artificial stupidity

So what does the future hold for behavioural finance? With the rise of Big Data and machine-learning algorithms, some investment firms have spotted a new alpha opportunity. The quantitative hedge fund industry has developed sophisticated computerised investment models that can ruthlessly zero in on mispricing or arbitrage opportunities human traders are too slow to spot.

Even the most sophisticated AI-led investment tools have built-in limitations, however. Machine algorithms risk what is known as 'overfitting', a tendency to make conclusions on the basis of random correlations, mistaking noise for signals.¹⁰ A deeper problem is that, while algorithms tend to be good at exploiting a particular inefficiency, they are less good at adapting when the environment shifts.

COGNITIVE BIASES

Irrational behaviour is not just random. It is often predictable, as people tend to be prone to the same unconscious biases. More than 170 specific cognitive biases have been identified by psychologists. Here are some of the biases that are most relevant to financial professionals:

ANCHORING

A tendency to anchor thinking to a reference point even when it is illogical or no longer relevant.

AVAILABILITY HEURISTIC

Overestimating the likelihood of events that are more familiar or recent, even if they are less common than unfamiliar scenarios.

CONFIRMATION BIAS

Seeking out information that confirms, rather than contradicts, one's preconceptions.

LOSS AVERSION

The pain of losing outweighs the pleasure of winning, so investors are quick to sell rising assets and reluctant to sell those falling in value.



BANDWAGON EFFECT

A tendency to replicate others' decisions, however irrational. Also known as herd behaviour.

GAMBLER'S FALLACY

Believing future probabilities are altered by past events, like a run of 'heads' on a coin toss.

HINDSIGHT BIAS

The tendency to believe past events were predictable at the time. This can lead to another bias, overconfidence.

'HOT-HAND' FALLACY

The belief that a person who has randomly experienced success is more likely to succeed in future attempts.

STATUS QUO BIAS

A desire for the current state of affairs to continue, however undesirable it is.

"Most quant models are designed to exploit a particular factor, whether that is value, momentum or size," says Parkinson. "There will be times those factor strategies do not work, either because the factor is cyclical, or because the structure of the market has changed and the opportunity has disappeared permanently. What do you do as a quant investor in that situation? Do you leave the model running in the hope it will work again, or do you decide it is the model that is flawed?"

Due to their difficulty in adapting to contextual changes, autonomous machines risk becoming trapped in feedback loops, repeating the same trades without registering their distortive effects on the wider market. The Financial Stability Board warned of this danger in a recent paper on AI.¹¹

Then there is the risk the computers could simply malfunction, as was the case with high-frequency trading firm Knight Capital. The company collapsed in 2012 after it sustained losses of \$440 million due to a flaw in its algorithms, inflicting disruption on other investors. In a note on the incident, analysts at research provider Gavekal observed: "Sometimes all computers do is replace human stupidity with machine stupidity, [which] can devour markets far faster than any human panic can achieve".¹²

BEYOND THE CAVE

continued

Beyond the cave

For all our flaws – the unconscious biases, the proneness to stress and anxiety – humans still have key advantages over machines: the ability to adjust to the uncertainty of a rapidly-changing environment, the capacity to appreciate ambiguity and nuance. There are advantages to be gained from incorporating computing power into investment decision-making, but only when it complements human judgement. Bringing together design, data and psychology, the digital nudge offers a way to combine the best traits of humans and machines.

Take chess. Despite massive leaps forward in AI, the best players aren't algorithms but so-called 'centaurs'; human players given the freedom to consult computers that can alert them to potential pitfalls before they make their own decisions as to the next move. In the same way, data-led tools can help both professional and non-professional investors become aware of their biases, and consciously work to counteract them.

While it is no magic bullet, the combination of digital platforms and psychological insights is already having a transformative impact across economics, government policy and financial decision-making. Behavioural science teaches us that part of our brains will always remain in that dimly-lit prehistoric world, in which we relied on instinct to survive. By using the power of data, we are beginning to emerge from the cave, one carefully-constructed nudge at a time ●

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BEHAVIOURAL SCIENCE FOR FINANCIAL ADVISERS:



AN INTERVIEW WITH GREG DAVIES

Greg Davies is better placed than most to comment on the future of behavioural finance. He spent more than a decade as head of behavioural-quant finance at Barclays, where he built and led the world's first applied behavioural finance team, before moving on to found behavioural consultancy Centapse. In 2017 he joined research firm Oxford Risk as head of behavioural science. In this Q&A, Davies explains how new data-driven technologies can be used to correct investors' irrational behaviour.

AIQ: Why has behavioural finance risen in prominence in recent years?

Greg Davies: Academic economists did their best to write any form of 'human-ness' out of their theories for a long time. And yet the fact that financial decisions are motivated by personality and emotion should not be at all surprising.

During the financial crisis, it became very apparent that the role of behaviour had been vastly underestimated in all aspects of applied finance. It's fair to say behavioural economics was the only economic field that came out of the crisis with better PR than it went in with. There was more of a story to tell. Suddenly behavioural economists had a very tangible example of what happens when you don't take people's behaviour into account.

AIQ: Behavioural economists have drawn attention to the role of cognitive biases in influencing human behaviour. Are there any biases that are particularly important for financial advisers to consider?

GD: I think there has been something of a 'bias' bias in the industry. There has been a tendency to throw the word 'bias' on the name of every new psychological anomaly and add it to a list. Think of it this way: most people essentially face a trade-off between the right thing to do and the comfortable thing to do. Biases influence what feels comfortable and intuitive.

Sometimes what feels comfortable is the same as a good decision, but unfortunately that is rarely the case when it comes to financial decision-making. Most non-professional investors leave their money in cash for much longer than they need to because it is psychologically

uncomfortable to expose yourself to risk; they are effectively buying emotional comfort at the expense of long-term returns.

There is an interesting analogy in football. In penalty shootouts, goalkeepers leap to the left or right 90 per cent of the time, but the ball goes down the middle 40 per cent of the time. In purely statistical terms, goalkeepers would do better if they did less. So why do they dive? Because it is less discomfoting to fail having made a spectacular leap, than if they stand there doing nothing. In all sorts of ways, people trade payoffs for comfort.

AIQ: How can behavioural science help advisers quantify their clients' risk tolerance?

GD: The idea that some people might want to take more risk than others is a fairly standard part of traditional economic theory. Regulators require advisers to make an effort to measure risk tolerance. But how you figure out someone's risk profile quickly becomes very behavioural. You can't just ask people how much risk they are willing to take, as their answer will change depending on what they read in the newspaper that morning or what they heard at the dinner party last night. If you are trying to figure out something that is going to be the hook on which you hang someone's investment portfolio for the next 20 years, you don't want that something to be unstable.

This is where behavioural science comes in. There is a whole history of psychometric testing that tries to understand how we establish what is deep-seated, underlying and stable about an individual's preferences and tolerances. Using an empirical, data-driven approach, it is possible to ask questions that validate an investor's risk tolerance traits against background data from hundreds of other people. There are other ways to measure risk tolerance used in the academic literature, such as asking people to pick between portfolio A and portfolio B. But applying these approaches is misguided and even dangerous when applied to financial advice – these questions have been designed to test ephemeral in-the-moment attitudes, rather than long-term stable risk tolerance. They provide an answer, but not one that is stable or that answers the right question.

AIQ: Could you expand on why this is a problem?

GD: One issue is that there are many things about people which are not directly related to risk tolerance that are nonetheless extremely important to their decision-making. To give one example: you may have two people with the same level of risk tolerance: i.e. in the long run they are willing to trade off risk and return in exactly the same way. One of them is incredibly laid back, and never checks their portfolio. That person is probably costing themselves money somewhere, because they are not rebalancing or adjusting the portfolio when needed. The other person is extremely anxious, checking their portfolio too often and feeling every bump in the road.

These two people need something different. While they might not need different portfolios, they definitely need a different type of communication from their advisers to ensure they are making the right decisions.

AIQ: How is technology being used in the advice industry to help improve financial decision-making?

GD: There are three aspects to this: digital, data and design. Think of it as a Venn diagram: you have digital platforms as a

mechanism for delivery of information; data that can enable you to personalise what you put in front of clients through the digital channel; and a design that makes the platform comfortable and easy to use. Then you have behavioural science at the centre to pull all of these elements together. With this combination we can build 'decision prosthetics'; tools that will draw in data and, as a result, lead clients through decisions in a way that is uniquely and personally tailored to them.

AIQ: Is this about automating decision-making?

GD: This isn't about removing people from the process – it isn't 'robo'. It's about providing people with tools that make them more consistently their best selves. These tools can lead to fewer errors because you are presenting information to clients in such a way that they can consciously counteract their biases. A computer can crunch the numbers quicker and more objectively than a person can. This is about freeing people up to do what people are good at, such as appreciating ambiguity and nuance.

AIQ: Could automated processes be used by investors to capitalise on irrational behaviour among their peers?

GD: Something as simple as a momentum factor in investing is effectively a behavioural factor that can be plugged into a quantitative model. There are a number of hedge funds using machine-learning techniques to process much bigger corpuses of data in this way to tease out anomalies.

So can we apply artificial intelligence to investing? Yes, probably. My concern is this: one thing machines are good at doing is taking information within a defined and stable set of rules and looking for every small inefficiency humans would not see. What they are not good at is dealing with a changing set of rules. If the structure of the market changed somehow, a machine might start taking massive leveraged bets on what it perceives as anomalies, when the reality is simply that the environment has changed. If you let machines loose in this way it might result in catastrophic losses.

AIQ: So in your view, a combination of machine tools and human decision-making is the way forward for investors?

GD: Systems that combine human and non-human elements can be greater than the sum of their parts. Chess is a good example. After Garry Kasparov was beaten by IBM's Deep Blue chess computer in 1997, he started playing a new form of 'centaur chess' in which humans play alongside machines. To this day, a human player using a simple chess computer can achieve a level that is far higher than either a grandmaster or an AI-driven supercomputer.

AIQ: If there is a single thing behavioural science can teach individuals about investing, what is it?

GD: Investors are largely 'passive aggressive'. They are passive because they leave far too much of their wealth in cash doing nothing for far too long. And they are aggressive because the bit that they do put into the market they constantly tinker with. We would all be better off doing the opposite: putting all of our wealth in the market and then doing nothing. Needless to say, this is easier said than done ●

CAN ABENOMICS SURVIVE WITHOUT ABE?

Shinzo Abe's policy programme has started to lift Japan out of its long deflationary slump. But the road ahead is still a long one and political scandals could prevent him from finishing the job.

Shinzo Abe is no stranger to controversy. But a series of recent scandals have left the Japanese prime minister fighting for his political future. Abe faces allegations he used his influence to force a cut-price sale of government land to a nationalist school; meanwhile his defence ministry stands accused of a cover-up of troop logs dating back to the Iraq War.

In May, Abe's embattled administration suffered a further blow with the news that Japan's GDP contracted by an annualised 0.6 per cent over the first three months of 2018. This was the first quarter of negative growth since 2015, bringing an end to the country's longest period of economic expansion since the boom years of the late 1980s. Analysts blamed extreme winter weather and an accompanying sharp decline in domestic demand for the unexpected slowdown.

Look deeper and Japan's economy remains in decent shape, with low unemployment, soaring corporate earnings and a stock market touching 26-year highs. By most measures, Japan's prospects look much

rosier than they did in 2012, when Abe's Liberal Democratic Party (LDP) entered government promising to tackle stagnant growth, low productivity and other deep-rooted structural problems.

But the latest GDP figures show the gains made under 'Abenomics' are still fragile, and could yet be reversed. As Abe scrambles to secure his position ahead of a crucial LDP leadership vote in September, thoughts in Japan are turning to issues of succession and legacy. So what more does Abe need to do to complete his task of rejuvenating the Japanese economy; and can Abenomics survive, even if its chief architect falls on his sword?

Three arrows

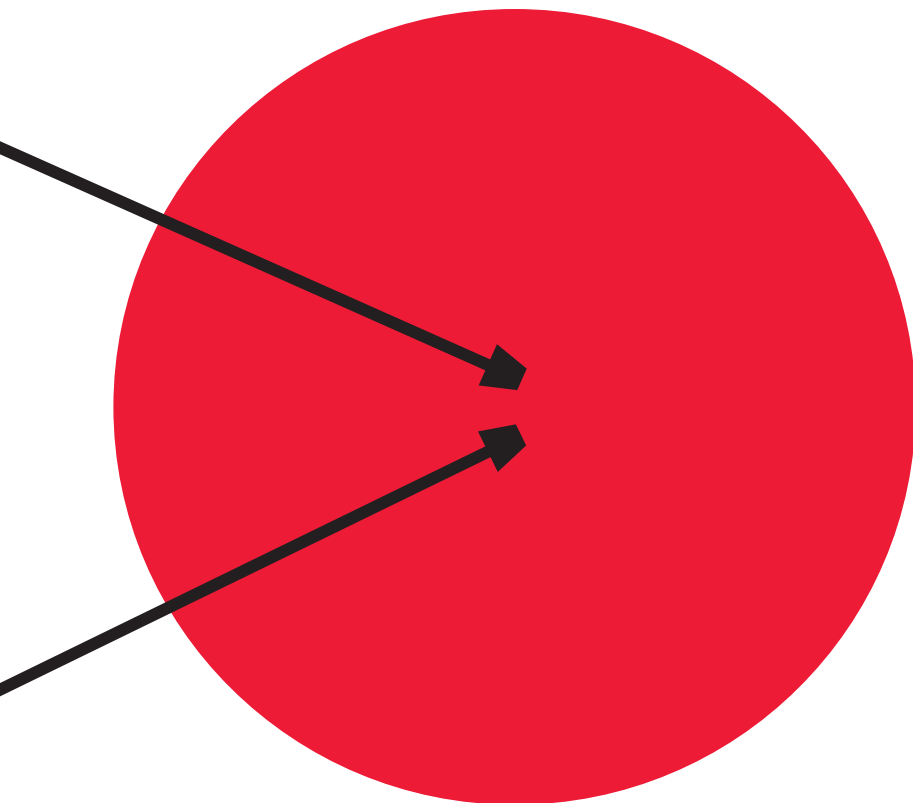
To properly assess Abe's record, you need to look at the predicament Japan faced before his second stint as prime minister.

Abe had previously served a brief and undistinguished term in office beginning in July 2006, before resigning due to ill-health the following year.

During his election campaign in 2012, Abe decided to recast himself as a unifying strongman, invoking a well-known parable to muster public support. In the story, a feudal lord demonstrates it is easier to snap a single arrow over one's knee than to break three arrows tied in a bundle – it's his way of teaching his heirs they are better off when they stick together.

Styling himself after this wise patriarch, Abe unveiled three 'arrows' of his own, a clutch of policies designed to revive Japan's flagging economy. The first arrow denoted extraordinary monetary easing, intended to banish the threat of deflation; the second, fiscal stimulus to offset the slack in private investment; and the third, structural reforms to spur greater efficiency and productivity.

In 2013, when Abe began to implement these policies, the country's nominal GDP was the same as it had been in 1991 and the Nikkei had fallen far below its peak level three decades earlier. What's more, Japan faced dire structural challenges in the form of a rapidly-ageing workforce and a monstrous debt load that exceeded 200 per cent of GDP.



Abe was able to call on support from Bank of Japan (BoJ) governor Haruhiko Kuroda, whom he nominated for the post soon after the election. Kuroda had long been an advocate of monetary easing to stave off deflation. On taking the post in March 2013, he said the BoJ would do “whatever [it] can to lift Japan out of the state of deflation that has sapped spirits and stifled investment for most of the past 15 years”.¹

Monetary policy

Kuroda fired the first arrow of Abenomics soon after his appointment. In April 2013, he announced the BoJ planned to double Japan’s monetary base to 270 trillion yen (\$2.8 trillion) by December of the following year, mainly by expanding its purchases of long-dated government bonds. But Japan’s deflationary slump was more difficult to shake than expected, and the yen proved stubbornly strong.

“Governor Kuroda and Abe, both of whom initially held a genuine belief that the BoJ’s activist monetary policy would singlehandedly terminate Japan’s

deflationary mind-set, were forced to recognise the problem was far deeper and more complex than their original expectations,” says Jin Saito, managing director and co-founder of Observatory Group, a consultancy.

In 2015, volatility in China’s equity market prompted safe-haven flows and the Japanese currency rose in value. Not to be dissuaded, the BoJ doubled down on its easing policies: the following year it introduced negative interest rates; reiterated its commitment to inflation of two per cent; and started a policy of ‘yield curve control’, a method of using QE to hold the 10-year government bond yield at zero per cent.

Unlike its peers in other developed economies, the Japanese central bank has also engaged in large-scale equity purchases. As of March 2018, the BoJ held about three trillion yen in domestic equity exchange-traded funds, an amount equivalent to three per cent of the entire capitalisation of the Tokyo Stock Price Index (Topix), according to estimates

from the *Nikkei Asian Review*.

The BoJ forecasts a median inflation rate of 1.3 per cent for 2018, still far below its target. But the spectre of deflation appears to have been successfully exorcised. As of April, the year-on-year change in consumer prices (excluding more-volatile fresh food items), had remained in positive territory for over 12 months – a notable achievement, according to Jean-François Chambon, fund manager, Japanese equities at Aviva Investors in Paris.

“For a period of about 15 years before Abe became prime minister for the second time, the CPI consistently fell. Families postponed big-ticket purchases in the expectation prices would fall further, and innovation declined as companies were unable to charge higher prices for new products. The reversal of this mindset is very important,” Chambon says.



CAN ABENOMICS SURVIVE WITHOUT ABE?

continued

Fiscal stimulus

After his election, Abe promised trillions of dollars in fiscal stimulus, which would be spent on infrastructure projects to improve productivity and offset high savings rates across corporate Japan. In response, some more hawkish elements in the LDP cautioned against lavish spending, given the country's record levels of public debt.

Five years on, the loudest voices in the administration are complaining there has been too little stimulus, rather than too much. Taking into account the 2014 hike in consumption tax from five per cent to eight per cent – widely criticised as a misstep – there has in fact been a fiscal contraction during Abe's tenure.

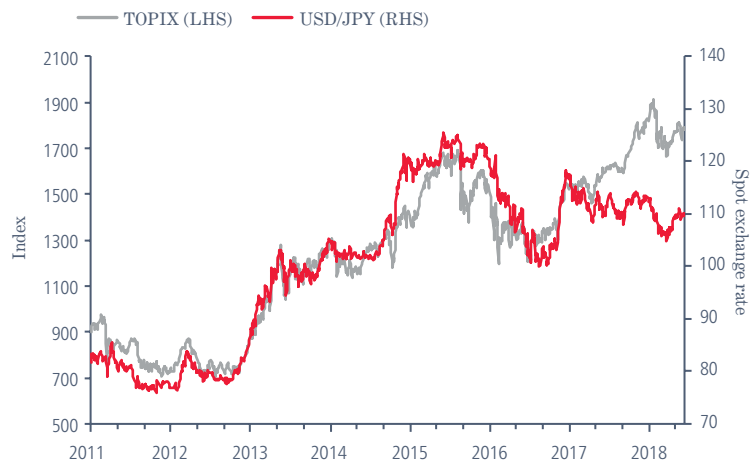
GDP growth dipped in 2016, sparking concerns the Abenomics project was flagging. Abe launched a new \$45 billion round of stimulus, including support for small- and medium-sized enterprises and financing for reconstruction on the earthquake-wracked island, Kyushu. In early 2018, Kozo Yamamoto, minister for regional revitalisation and an influential member of Abe's cabinet, told the *Financial Times* he would argue for further aggressive stimulus this year.³

"The country's fiscal policy has not been consistent: positive from 2013 to early 2014, but negative from the consumption tax hike of 2014 on until late 2016, and once again positive since then," says Saito, who believes greater coordination in monetary and fiscal policy over the past 18 months may have started to pay dividends in the form of higher employment. According to the latest official figures disclosed in May, the unemployment rate stood at an impressive 2.5 per cent.⁴

Structural reform

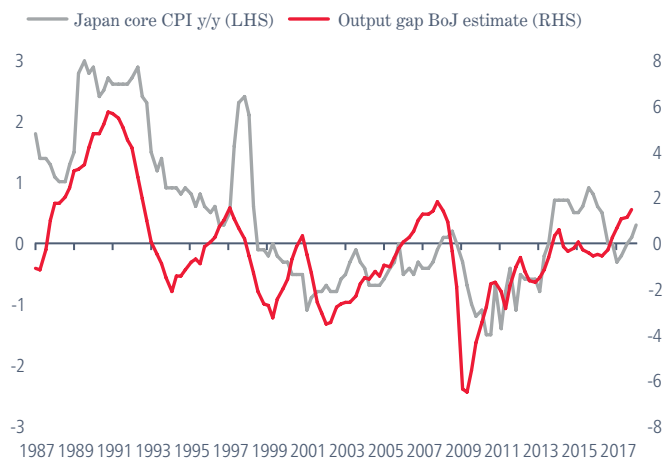
Despite these gains, more remains to be done. The disappointing growth figures for the first quarter of 2018 suggest domestic

Figure 1: Japanese equity market performance



Source: Aviva Investors and Macrobond, as at March 30, 2018.

Figure 2: Inflation picks up



Source: Aviva Investors and Macrobond, as at March 30, 2018.

consumption may not be strong enough to constitute the dominant driver of growth. And companies remain reluctant to invest in new products and services, partly because wage growth has yet to pick up.

Last year, Abe called for Japan Inc. to raise wages by three per cent, offering tax incentives for firms that fell into line. But the latest round of *Shunto* Spring wage negotiations between management and unions failed to produce the desired result; year-on-year wage growth stands at 2.1 per cent, according to the figures from the Ministry of Health, Labour and Welfare disclosed in May.

Ironically, low wage growth may be a consequence of Abe's successes in another area: structural reform. The LDP has been pushing for a rise in the number of women and retirees in employment and this has put downward pressure on wages. The proportion of women aged 16 to 64 in full employment rose to a record high of 69.4 per cent in February 2018, up from 64.5 per cent in January 2013. Japan's figure is now higher than that of the US and France, according to the Organisation for Economic Cooperation and Development (OECD).

Over the longer term, widening participation in the workforce should help



INVESTMENT IMPLICATIONS

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Progress on structural reform is generally sluggish

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Japan cope with the effects of its rapidly-ageing population, as should Abe's tentative liberalisation of visa rules to enable more immigration (the number of foreign workers in Japan has risen – albeit modestly – from 682,000 to more than a million under Abe⁵). Relaxed visa rules have also boosted tourism, which could prove to be a major investment theme over the coming years (see boxed text).

Corporate governance

Other mooted reforms have fallen by the wayside, however. “Progress on structural reform – to promote higher and sustainable growth – is generally quite sluggish,” says Maulshree Saroliya, macro strategist at Aviva Investors. “While there has been a modest uptick in productivity thanks to better growth last year, Japan needs to go further to prevent a slide in living standards. This requires better credit allocation to boost innovation and investment. Firms need to change their business models to boost profitability.”

Abe has taken steps to reform corporate Japan. By pushing the Government Pension Investment Fund (GPIF), Japan's gargantuan pension fund, to build its portfolio of domestic stocks – and become an activist shareholder – he has encouraged a greater focus on shareholder returns and corporate efficiency, according to Chambon.

A new corporate governance code, introduced in 2015, compels Japanese banks to significantly reduce so-called ‘cross-shareholdings’ that foster close

The latest political developments in Japan will be watched with keen interest by investors, for whom Abenomics has brought significant advantages.

Sunil Krishnan, head of multi-asset funds at Aviva Investors, points to the structural support provided by the BoJ's ETF-buying programme, for example.

“The Bank of Japan's willingness to purchase equities as part of its monetary stimulus toolkit places it apart from its major peers. The simple fact of a structural buyer is supportive for the market, but it's also noticeable the BoJ is a more active purchaser during periods of market weakness. This, together with evidence that monetary stimulus is actually working to deliver a solid domestic recovery, leaves Japanese equities well positioned in a global context,” Krishnan says.

The rising value of the yen could yet erode corporate profits, and continued QE offers little advantage for fixed income investors, given the policies the BoJ uses to hold yields low. “The variation in JGB yields has been minimal since the advent of the yield control policy in 2016,” says Saroliya. “With the yield curve exceptionally flat, the total returns available to investors are very low. There is very little residual QE tailwind for fixed income returns in my view.”

A more pressing hazard facing investors is the potential demise of Abe's scandal-hit government. The political continuity Abe has offered is a key part of Japan's recent economic improvements and positive for investor sentiment. “Abe's successor would need to keep moving forward with the ‘three arrows’, as structural changes are not a luxury but a necessity. But there's no doubt that effecting these changes will be far more difficult without Shinzo Abe at the head,” says Chambon.

If Abenomics continues, with or without Abe, certain sectors of the economy may benefit more than others. Chambon picks out tourism as an example. A combination of the weaker yen and looser visa regulations has led to a rapid increase in visitors from China under Abe, leading to the phenomenon of *Bakugai*, or ‘explosive buying’, which can quickly transform consumer sectors.

“Chinese tourists have been spending vast sums on consumer products such as children's diapers, which are regarded as higher quality than Chinese-made brands. More recently, Chinese spending appears to have shifted towards food and cosmetics supplements. Hotel and restaurant chains are also likely to benefit from a continued rise in visitor numbers from China and elsewhere ahead of the Tokyo Olympics in 2020,” Chambon adds.

Over the longer term, robotics manufacturers and companies that specialise in upgrading production-line efficiency are likely to benefit from the structural shift towards greater automation in Japan as the country's workforce continues to shrink. Companies with expertise in working with high-end manufacturers to make incremental improvements to efficiency and quality – such as Osaka-based firm Keyence, a specialist in precise, laser-guided automation systems – could reap dividends as firms seek to tool up their facilities ●



CAN ABENOMICS SURVIVE WITHOUT ABE?

continued

connections between bankers and their clients. The practice has been identified as one of the reasons why Japanese companies are rarely held to account for failing to deliver higher returns on investment.

Chambon believes these reforms are bringing results. Before Abe, he says, bad economic news tended to beget worse; deflation led to a negative spiral of lower consumption, lower growth and lower wages. But now, with companies more profitable, Japan could be set for a virtuous circle of stronger wage growth and higher consumption – at least for as long as Japan persists with Abenomics.

Abenomics without Abe?

The recent corruption allegations have thrown the future of Abe's economic programme into doubt. They relate to the cut-price sale of state-owned land to Moritomo Gakuen, a nationalist school with links to the prime minister's wife, Akie. The news first broke last year but the scandal escalated in March, when the finance ministry admitted removing references to the Abes, along with finance minister Taro Aso, from the sale documents.

In a testimony to the upper house of the Japanese parliament in March, Nobuhisa Sagata, the former finance ministry official at the heart of the scandal, said neither the Abes nor Aso instructed him to falsify the documents. But he refused to answer questions about why his staff doctored the files, citing an ongoing investigation. The prime minister's political opponents have pressed for Akie Abe to appear in parliament to answer questions.⁶

Abe also faces accusations that he used his position to help a friend open a veterinary school,⁷ while the government's handling of historic military troop logs has inflicted further reputational damage.⁸ A poll conducted

by the *Asahi Shimbun* newspaper in the wake of the Moritomo Gakuen revelations in late March had Abe's approval ratings down 13 percentage points, at 31 per cent, the lowest they have been during his tenure, although some polls show they had recovered to over 40 per cent by early May.

In Abe's favour is the fact the opposition remains in disarray after the LDP's landslide win at the general election in November 2017. "Currently there is nobody in the main opposition party, the Constitutional Democratic Party of Japan (CDP), ready to lead the country," says Chambon. "Even if the popularity of the LDP is going down, the popularity of the CDP is not going up."

For now, Abe appears to retain the support of his core constituency. If no hard evidence emerges linking him to the land sale, he may yet survive to fight for re-election as head of the LDP in September. Even if he doesn't, there are signs Abenomics will live on. Although most of the likely successors to Abe in the LDP – including Fumio Kishida, a former foreign minister, and one-time defence minister Shigeru Ishiba – are equivocal about Abe's economic policies, they have yet to put forward alternative plans.

In fact, Abe's successor – should it come to that – may have much to gain from persisting with his policies. The LDP's victory in November was widely taken as a ringing endorsement of its economic stewardship. According to surveys conducted by the Cabinet Office in Tokyo last year, 73.9 per cent of Japanese people are generally satisfied with their living standards, higher than ever. Just over half said they are satisfied with their income conditions – the first time positive sentiment has outweighed negative for that question since 1996.

Perhaps more importantly, there is the institutional will across the broader

policymaking framework to continue deploying the arrows of Abenomics. Kuroda was reappointed for another five-year term as BoJ governor in early March, backed by two new deputies who support his approach.⁹ Although the bank has started to subtly reduce the rate at which it expands its balance sheet this year, Kuroda has committed to staying the course on QE until Japan definitively emerges from its long economic torpor. In its latest meeting in April, the BoJ said it would keep the yield on 10-year government bonds at near-zero per cent.

Beyond Japan, Abenomics has also won the backing of some influential institutions, including the initially-sceptical International Monetary Fund (IMF), which last year proclaimed the policy programme a "success" for banishing deflation. With a growing consensus at home and abroad that Abenomics is working, it could yet prove resilient – even as Abe begins to look less and less like the wise strongman in his favourite story ●

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In Abe's favour, the political opposition is in disarray

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- 1 'Japanese yen, bonds and stocks in the Abenomics era', *Financial Times*, April 2016
- 2 'Bank of Japan unveils aggressive easing', *Financial Times*, April 2013
- 3 'Japan's Abenomics mastermind calls for more aggressive fiscal policy', *Financial Times*, January 2018
- 4 Observatory Group
- 5 Observatory Group
- 6 'Former Japanese finance official Sagawa: no instructions from PM to alter land sale documents', *Reuters*, March 2018
- 7 'Abe denies 2015 meeting with Kotaro Kake as opposition pressure mounts over cronyism claims', *The Japan Times*, May 2018
- 8 'Japan's Abe faces fresh headache over Iraq troop dispatch logs', *Reuters*, April 2018
- 9 'Kuroda's second chance', *The Diplomat*, March 2018

DON'T FORGET YOUR COVENANTS

Competition in the private debt market has eroded investor protections. Understanding where the risks lie and how to mitigate them will be key to long-term investment success.

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Rival lenders are looking to win deals through flexible lending structures with less onerous covenants

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The rapid growth of private credit markets has been a distinctive trend since the turn of the millennium. From that point, the volume of privately-originated debt placed with large institutions and traded privately on secondary markets has grown at almost 20 per cent a year.¹ The level of interest reflects the advantages to be had from an asset class that can help investors enhance yield and diversify their credit exposure.

With banks constrained by the tighter regulatory environment following the financial crisis, non-bank lenders have stepped into the breach and stepped up their activity. As Basel IV has encouraged banks to trim holdings of large debt transactions, asset managers, insurers, private equity companies and hedge funds have all been actively scouring for private market opportunities.

One key benefit of private debt has traditionally been the extra security they provide in the form of covenants. The precise details are unique to each deal, but covenants often include financial maintenance clauses covering the volume of debt and the borrower's ability to service it. (See box on p.43 for the range of measures borrowers may be subject to.) By flagging when a company's financial strength might be deteriorating, the covenants are an important form of investor protection.

However, with growing amounts of capital seeking a home, rival lenders are increasingly looking to win deals through flexible lending structures or less onerous covenants. One specific outcome of the competitive marketplace has been the return of 'covenant-lite' loans, a phrase synonymous with loose credit conditions in the years leading up to the global financial crisis of 2007-2009.

Initially prevalent in the US among larger companies, lax lending terms have spread to Europe as well (although to a lesser extent in the small and mid-cap sectors). In fact, around 80 per cent of the senior loans extended to large European companies were reported to be covenant-lite by 2017.²

This has important implications for investors. Until recently, the existence of maintenance covenants differentiated private debt from publicly-listed high yield bonds. Certain private borrowers have had the opportunity to increase leverage, but this needn't have serious implications immediately in a period of global recovery. Nevertheless, fewer flags will be raised if and when financial metrics start to deteriorate, preventing lenders stepping in early to stop future defaults.



DON'T FORGET YOUR COVENANTS

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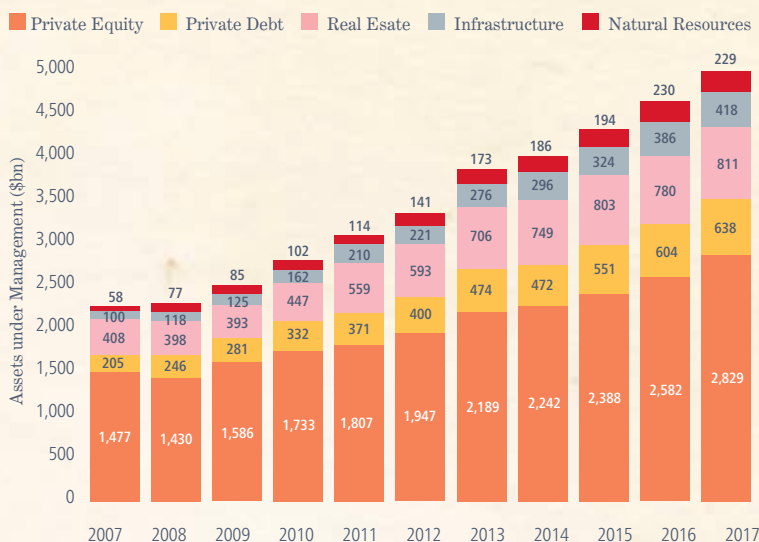
Mind your head(room)

Taking a role as a lead lender or sole lender in a private, direct transaction makes it possible to have much greater control over structuring and negotiating terms in a way that might protect investors in all market conditions. “It allows a more rigorous approach to risk, as appropriate lending criteria can be embedded within the loan documentation,” according to John Dewey, head of investment strategy in Aviva Investors’ solutions function.

To do this effectively requires a detailed understanding of the nature of the borrower, as well as the dynamics of the sector it occupies. For instance, a metric like debt-to-EBITDA – measuring debt to cash flow – will clearly be more volatile in cyclical industries. “A covenant of three times EBITDA might be aggressive in some industries – like retail – yet it would be conservative in other industries that offer more visibility and stability in terms of cash flow generation,” says Antoine Maspétiol, head of private corporate debt at Aviva Investors.

So the issue is not just if covenants exist, but how they are structured and how much protection they really provide. For instance, there has recently been an expansion of headroom in the real estate finance market. “There was a recent commercial-mortgage backed security issue which, at first glance, appeared to have a covenant for both interest costs and loan-to-value,” explains Gregor Bamert, head of Real Estate Finance at Aviva Investors. “But closer examination showed plenty of headroom for both covenants, and default would only be triggered if both measures were tripped. A more prudent approach might have been to have less headroom and default triggered by a single covenant breach.”

Figure 1: Private Capital Assets under Management (2007-2017)



Source: 2018 Preqin Global Private Debt Report

The return on the deal, after adjusting for anticipated losses, should be the final consideration. Riskier assets with higher yields should only be considered if the investor is willing and able to sacrifice some certainty over cash flows. Some private assets might offer lower returns, but also tangible benefits in that they can be held to maturity and relied upon to pay out as expected.

Default position

For those prioritising certainty, it is worth drilling down into recovery rates. The theoretical recovery rate is only useful if the manager has the skills to deliver when the borrower defaults. For example, the security a commercial property provides in a real estate debt transaction is only helpful if the manager can ensure a smooth transition if a default event actually occurs. “The manager needs to demonstrate it can find new tenants, sell the property at a fair value or achieve favourable re-financing terms,” says Bamert.

By focusing on the risks first and then the returns, a private credit manager will not be overly swayed by a seemingly attractive return at the outset.

Reviewing the insurance formula

While these considerations have implications for all long-term credit investors, insurance companies have additional features to bear in mind, which add to the complexity.

For instance, the Prudent Person Principle (PPP) governs investment for European insurers. One element of the PPP is that insurers should “only invest in assets and instruments whose risks the [insurer] can properly identify, measure, monitor, manage, control and report”.³

To address this concern, insurers have been seeking to increase their in-house expertise. Some have developed internal credit rating models for private debt assets, often leveraging the credit assessment process used by their asset managers.

This assessment includes consideration of the covenant protection within the deals, with some insurers using rating methodologies based on assessing expected losses rather than the likelihood of default. This issue is exacerbated by the overly-simplistic treatment of private loans within the Solvency II Standard Formula. For example, the same capital charge

applies to a private loan to a large, defensive corporate entity with covenant protection as a private loan to a small, highly-cyclical business with limited covenants.

The European Insurance and Occupational Pensions Authority has recently issued its advice to the European Commission on the treatment of private debt as part of the 2018 review of the Standard Formula.⁴ The proposed approach would reduce the capital charges for private loans issued to non-financial corporates that are deemed to be equivalent to 'A' and 'BBB' publicly-rated entities, subject to the asset, the borrower, and the insurer satisfying a number of criteria.

For UK-based insurers, the Prudential Regulation Authority is closely monitoring the use of private debt assets to match liabilities

arising from annuity products. UK firms typically use the Matching Adjustment (MA) framework under Solvency II to manage and value their annuity business. This enables the investor to value the liabilities at a higher discount rate, derived from the yield on their assets, minus defined haircuts for credit risk. There is clear regulatory benefit to using higher-yielding assets with a strong credit rating.

As the volume of private debt issuance has increased, competition has eroded some of the features that offer investors a level of comfort. Understanding the idiosyncratic elements of private markets transactions – where the risks lie and what controls are in place to mitigate them – will be key to meeting regulatory hurdles and deciding long-term investment success ●

“*There is clear regulatory benefit to using higher-yielding assets with a strong credit rating*”

- 1 'Financing the economy 2017: The role of private credit managers in supporting economic growth,' Alternative Credit Council, October 2017.
- 2 Directive 2009/138/EC of the European Parliament and of the Council, as at November 25, 2009.
- 3 EIOPA's second set of advice to the European Commission on specific items in the Solvency II Delegated Regulation, as at February 28, 2018.

A SHORT GUIDE TO COVENANTS

LOAN COVENANTS place obligations on the borrower that restrict how they can behave.

AFFIRMATIVE COVENANTS set out the basic background requirements for the recipient of a loan, for example to repay the loan itself with interest, provide financial statements or pay tax.

NEGATIVE COVENANTS can be tailored to limit specific activities, such as restricting acquisitions, issuance of new debt, asset sales or dividend payments within pre-defined ranges.

FINANCIAL COVENANTS set out financial performance measures to monitor. Common metrics are based around:

- **CASH FLOW** – requiring the borrower to maintain a minimum level of cash flow or earnings relative to expenses, such as debt service costs, rent.
- **LEVERAGE** – setting a ceiling on overall debt, relative to equity or cash flow. The level of total-debt-to-EBITDA is among the most common. Some agreements test net debt (total debt after cash and cash equivalents) or senior debt instead.
- **CURRENT RATIO** – monitors the ratio of current assets (cash, marketable securities, accounts receivable, inventories) to current liabilities (accounts payable, short-term debt of less than one year).
- **TANGIBLE NET WORTH** – tracking the physical worth of the company, after taking intangible assets e.g. goodwill, intellectual property, into account.
- **CAPITAL EXPENDITURE** – may limit capital expenditure (purchases of property, plant, and equipment) on an annual basis.

THE FUTURE OF FIXED INCOME

We consider how technological advances, alternative data sources and shifting investor flow dynamics are changing the face of fixed income markets.

Prior to the financial crisis, economists and company analysts had been seemingly satisfied with a physicist's view of the world where cause and effect rules; a pressed economic lever here leads to a predictable and repeatable consequence over there. But as the rules broke down in 2008, the idea that the market summed all knowledge into a single price was shown to be woefully inadequate.

Post the crisis, investors went searching for new ways of describing the world; ones that evolved, learned and adapted as time went by and were less rooted in rigid rules that could become obsolete without them realising. More importantly, they wanted to make better predictions and deliver more stable returns, which meant moving from price-rich to data-rich assessments of value. A new type of investor has emerged; one that embraces the rapid technological change underway and keeps an open mind – always looking for creative new ways to find an edge.

There are three main trends emerging that help shine a light on where fixed income is headed: alternative data, artificial intelligence and structural flow dynamics. We take a detailed look at each in turn.

1. DIGITAL SCAVENGER: the new-breed economist

A generation of fixed income managers were brought up on the idea bond management was synonymous with economics; interest rates were a function of the economic cycle, while bond yields and the yield curve were a function of today's interest rates and speculation about their future path. Bond managers would regale you with endless charts of money supply, inflation, unemployment, ISM surveys and Gross Domestic Product. Given the slightest encouragement, they would slip data going back tens, if not hundreds of years, into a spreadsheet and set about predicting the next move in borrowing rates.

Macroeconomics, as practiced by the financial markets, is about collecting data about each other; something we've been doing for a long time and in a variety of forms. The 1970s were altogether simpler and more direct times: rummaging through trashcans, as pioneered by William L. Rathje at the University of Arizona, showed that even recent artefacts could tell you a lot about the people who used and discarded them. 'Garbology' became a valuable method of defining social trends.

Data scientists are continuing the rummaging model. But instead of going through your rubbish bins, they are doing it in real-time, collecting lots of data from a wide array of places, with no obvious connection to each other, in order to make economic predictions. From apparently-disconnected digital breadcrumbs, a behavioural profile can be stitched together.

For the new breed of analyst, social media is an indispensable source of data to base predictions on. Companies actively scan platforms like Facebook, YouTube, Instagram, Twitter and Pinterest to decipher preferences, choices and perceptions towards brands, companies, political parties. You name it; they want to find out what you think about it. And we tend to give the data away freely and willingly (See: *The Great Digital Detox?*). On Twitter, there are an estimated 10 billion tweets per day; Facebook's one billion users generate four new petabytes (about four million gigabytes) of data a day, and four million 'likes' a minute.

Transactional data, generated from the likes of eBay, Amazon, credit card providers and any online retailer you visit, is gathered by the bucket-load and stored in vast files. It is primarily used to predict consumer behaviour. Target, the large US retailer, can now accurately predict when one of its customers will have a baby just by knowing their personal data and mapping it to their expected life cycle. Others have started using aerial photography to monitor car park occupancy as a method of predicting retail sales. But its biggest use comes inside business intelligence units. Business intelligence models can respond

to changing perceptions through social and financial transactional data and even alter pricing in real-time as supply and demand fluctuates; micromanaging the business in a way monthly economic statistics series find it difficult to predict.

Inflation – from real world to real time

Even familiar macroeconomic variables suffer from real-world problems that the new algorithmic approach can help with. Take the one variable fixed income investors fret about the most: inflation.

The Billion Prices Project has been developed at the Massachusetts Institute of Technology (MIT). It relies on hundreds of websites all over the world to calculate inflation in real-time. Since online and offline prices appear to be fairly close most of the time, researchers can confidently show real-time data is a good predictor of monthly data releases, which are sometimes released with a lag of several months. It could provide an edge for fixed income managers hungry for information, helping them design winning portfolio strategies based on economic predictions. Already there are rich data sets to be found in Google Trends, while Twitter has been busy indexing hundreds of billions of tweets from 2006 onwards, covering human experiences and major historical events, so they can be correlated with future economic developments.

It is easy to imagine a situation where real-time economic statistics will replace the traditionally infrequent (monthly and quarterly) economic time series, creating with it a revolution in fixed income management.

2. AI AND MECHANICAL ANALYSIS: 'yielding' some answers

Predicting the future of the economy is one thing, but bond investors want to know whether interest rates are rising or falling, what will happen to the yield curve and, just as importantly, the likelihood of companies they invest in going bust and defaulting on their debt.

Modelling, interpreting and predicting the next yield curve movement is a valuable source of absolute and index-relative returns for government bond managers. Theories of how and why the yield curve moves the way it does have traditionally broken down into explanations based upon expectations about future interest rates, the behaviour of bond market participants or the lasting effects of long- and short-term information entering the market.² But no one theory has satisfactorily answered the question under all circumstances throughout history. It has been a vexed question ever since yield curve management came to the fore in the 1970s, and one that has been harder to answer since central banks started manipulating and nudging markets through massive quantitative easing programmes that have taken some of the 'free' out of the free financial markets.

Computational brute force

Most attempts to model the level and slope of the yield curve use macroeconomic factors and transactional flow data to predict future movements. But now more adaptive models are emerging. Researchers at the University of Thrace used machine learning, coupled with GDP data, to successfully predict the movement of the US yield curve 67 per cent of the time and every recession for the period 1976 to 2011.³ Other attempts to model the direction of bond yields using machine-learning models have shown they can outperform standard theory to a degree that would be of interest to bond market investors using conventional methods.⁴

If the level of yields and slope of the yield curve are two dimensions of bond management, the third is the direction of credit spreads; the difference between the yield on a corporate bond and a comparable government bond.

Credit spreads are a function of the collective thoughts of the market about the ability of a company to pay its annual interest bill and return investors' initial capital at maturity: the more likely a company will default on its debts, the higher the credit spread to reward investors

for the risks they are taking and vice versa.

There has never been a more important time to get this right: total global debt hit a record \$164 trillion in 2016, according to the International Monetary Fund, with debt-to-GDP at an all-time high of 225 per cent.⁵ Governments, local authorities, global agencies, companies, banks, mortgage providers, credit card companies, car and boat finance companies – the list is pretty much endless – are all included in the total. Credit analysis has gone from the minority activity it was a couple of decades ago into a crucial activity within bond management.

The question is whether the value of traditional analysis by humans; analysing balance sheets and projecting the fortunes of companies forwards, has been undermined by QE and central bank support for credit markets.⁶ Default rates appear artificially suppressed, which could mean problems are being stored up in the system that will only be revealed when interest rates and bond yields rise to any great extent. It would take vast legions of credit analysts to properly cover the interconnected system of debt fuelled by ultra-low interest rates, the cost of which would be hard to justify.

An alternative approach is to leverage computing power, using artificial neural networks and machine learning to predict credit ratings⁷ usually produced by in-house and external analysts.⁸ The inputs are familiar to any corporate debt analyst; sales, total debt, cash flows, income, financing costs. The output is just as familiar: a credit rating that can be used to assess the adequacy of credit spreads or reveal hidden gems to create an investment opportunity.

Analysing vast and disparate data sets to assess value could be a revolution in how fixed income departments function in future. Once the technique is honed and the most influential variables identified, bulk data processing can occur. In the new age of transparency, where one major consequence of the Markets in Financial Instruments Directive (MiFID) II has seen many fund managers absorb the cost of external research, you have a recipe for

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It would take vast legions of credit analysts to properly cover the interconnected debt system

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AI

What are artificial intelligence and machine learning and what are the differences?

Both artificial intelligence (AI) and machine learning (ML) seek to make predictions about the future using past data.

AI systems seek to understand the processes driving the predictions and draw conclusions about how a system is working. ML looks for the relationships that most strongly impact the process and give them the most weight in a model.



THE FUTURE OF FIXED INCOME

continued

revolution with Big Data as the sponsor. This could be significant as it transfers costly research via technology to asset managers, who can focus their attention on creating tools to aid bond selection.

Liquidity: trading places with tech

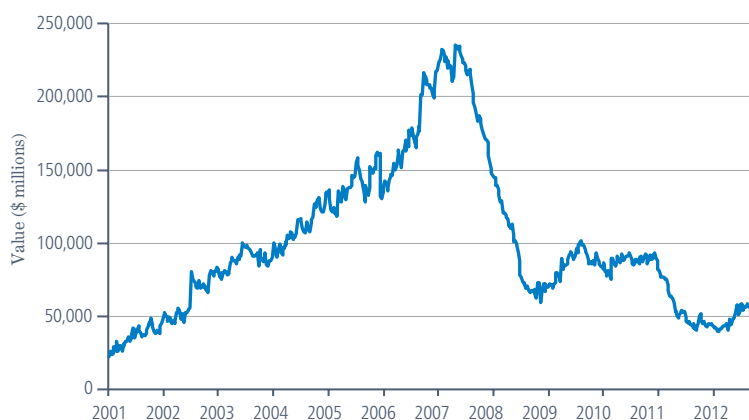
Prior to the collapse of Lehman Brothers, fund managers had become accustomed to buying and selling most things in their portfolios at will; the liquidity of the system was high. However, in the post-crash environment, the ability of investment banks to act as market makers has been severely hindered by tighter regulation.

The inventories of bonds held at investment banks has collapsed. According to the New York Federal Reserve, broker inventories fell from over \$200 billion to just \$60 billion within a year of the financial crisis beginning. With it went the assumptions of fund managers that they could buy and sell whatever they wanted, whenever they wanted. Pre-trade information like multiple quotes and what successful trades looked like in the past has become scarce and fragmented. If you were a fund manager trying to find the right additions to your portfolio, the whole exercise became time consuming, frustrating and sometimes futile.

The effect has been felt across the market, but the most profoundly wounded area was the corporate bond market, leading to concerns about the ability of some goliath corporate bond funds to raise cash should clients want it.⁹ This is another area where artificial intelligence, machine learning and Big Data stepped in to fill the information void in the shape of Project Neptune.

Project Neptune was created out of a consortium of 22 banks working with buy-side companies to pool real-time information on what is on offer in corporate and emerging bonds.¹⁰ This is the first step towards regaining the liquidity institutional investors need to transact large trades.

Figure 1: US dealer inventories



Source: New York Fed

After its launch in 2017, it was envisaged Neptune would provide real-time information on more than 14,500 different securities with a notional value in excess of \$131 billion generated from over 26,500 pre-trade buy and sell indications, daily.¹¹

Although Neptune isn't a trading platform, it is another piece in the jigsaw of automating the trade lifecycle, starting with portfolio cash flow through instrument selection and culminating in the execution of a trade. For the time being, the emphasis is on creating visualisations of liquidity and what it takes to make a successful trade, as an aid to decision-making for fund managers and their counterparts on the other side of a trade.

Reinforcing the idea of AI as an aid, Dutch financial services company ING has launched Katana, an artificially-intelligent trading tool that uses predictive analytics to aid price discovery for clients. The belief is that a human with AI support performs better than one without.¹² However, developments in other areas of financial markets, like equities, suggest automation for fixed income is only a step away.¹³ It won't be long before the data-rich algorithm-driven technology of Amazon, Netflix, YouTube and Alibaba will be used to show trades to clients based upon their preferences and previous buying history.

It is part of a trend that sees dealing as much more part of the investment process than a few years ago. Some dealing desks see bond trades as either 'High Touch' or 'Low Touch' depending on how much

hand holding is required. AI and pooled data are set to combine with order-management systems and connect to execution management systems, increasing the integration of investment with dealing. Dealers will then be able to spend more time handling time-consuming exceptions.

3 DEMOGRAPHICS ARE DESTINY: what gives between central bank manipulation and ageing populations?

Even allowing for the decline in annuities, bonds are set to become a larger and larger part of portfolios. The great gravitational force of demographics alone will pull portfolios towards owning more fixed income assets. At the same time, the amount of debt in the world issued by national governments and companies is increasing, making credit risk management as important as investment returns. The clash between rising credit risk and the need for retirement income will be the major preoccupation of bond managers for decades to come.

Stretched government finances are the starting point for a sea change in attitudes towards borrowing. The sense of restraint and belt-tightening, combined with tax hikes in the post-crisis era, is gradually being loosened as voters tire of what seems like a constant assault on jobs and services. Already, there is talk of the 'Great Divergence' as US fiscal policy and spending is loosened while Europe holds on to its hard-won discipline. According to the IMF's 'Fiscal Monitor', the US will have

a debt-to-GDP ratio of 117 per cent by 2023, putting it on a par with Italy on current plans.¹⁴ Even in Europe things are changing. The rise of populist movements, like Five Star in Italy, promising greater expenditure and a guaranteed basic income for the poor, is a possible sign of things to come. Faced with unfamiliar government credit risks, bond investors won't be able to rely on fiscal responsibility to do their credit work for them in the future, even for the best-known nations.

But the true severity of the situation is masked by the backwards-looking nature of debt-to-GDP ratios; they miss out pledges made to future generations in the form of benefits, social care, healthcare and pensions. According to the World Economic Forum (WEF), the world's six largest pensions savings systems – the US, UK, Japan, Netherlands, Canada and Australia – are expected to have a shortfall of \$224 trillion by 2050. Add in China and India, the two most populous countries, and the combined savings gap reaches \$400 trillion, or 500 per cent of the global economy by that time. This will "imperil the income of future generations and [set] the industrialized world up for the biggest pension crisis in history", as WEF puts it.

Faced with this problem and with many nations already hitting their credible debt ceilings, stark choices need to be made, which could include: reneging on current promises, increasing taxes on income and wealth, increasing borrowing radically to reflate the economy, defaulting on debt and devaluing currencies.

All of the options spell trouble politically, economically or in the markets, giving investors a difficult course to negotiate in the decades to come. For bond managers, the ability to distinguish between yield and the ability to pay will never be more important to their clients.

A more sanguine view would be that rising debt availability may pose credit risks but growing liabilities also create bond buyers. Bond yields may not rise to catastrophic levels as some expect; asset-liability matching demand outstrips debt supply, but this may change the power dynamics of the world; debtor nations could be in the thrall of creditor nations. We've already had a taste of things to come as China, which has one of the largest bank accounts and is one of the largest owners of US government debt, continues to remind

the US authorities of their responsibility to not default on their debt obligations;¹⁵ a scenario that would have been unthinkable a decade ago.

If debt is the lifeblood of capitalism, another episode similar to 2008 is almost certain to happen. Future bond managers will be preoccupied trying to spot the onset of the next crisis.

Bionic bond managers...

Things are changing fast in the fixed income industry. Bond managers of the future will use new sources of real-time economic and company data to guide their decisions on timing and value, implementing transactions peer-to-peer through anonymised arenas secured by incontrovertible blockchain records. The entire process may even become completely automated as asset-liability matching programs tweak portfolios in real time via commoditized government bond and currency platforms.

None of this is to suggest human input will, or even should, be eradicated; the algorithm-inspired flash crash of May 6, 2010 at 2.45pm that caused the Dow Jones Industrial Average to fall nine per cent in 30 minutes, or the seizing up of the bond markets during the 2013 Taper Tantrum, illustrate markets need adult supervision from time to time. What organisations are seeking in the next phase of tech-driven fund management is the correct balance between what should be automated and what is best left to far-sighted individuals who can intervene and create rules that express new paradigms.

However, day-to-day bond management is clearly being transformed. Where once rows of desks were filled with fund managers and their analysts managing individual portfolios, in the future they could be supplanted by data scientists creating smarter and better price discovery and implementation algorithms; humans create the strategies and trading rules and are left to monitor the exceptions. Already, some foresee artificial intelligence being directly incorporated into the trade and portfolio management process.¹⁶

Aided by the incontrovertible recording of trades using blockchain encryption, the way is open for new trading methods circumventing traditional trading broker-

client relationships. So far, wealth and asset managers have concentrated most of their resources on digital transformations benefitting their customers; better websites, richer account information and improved client communications.¹⁷ That technology spend is set to change. The bionic bond manager is coming ●

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TICKING TIME BOMB: WHY DEFICITS MATTER



Government debt-to-GDP ratios in many advanced countries are approaching post-World War II highs, leaving them increasingly vulnerable to a worsening in economic conditions and demographic forces, argues Stewart Robertson, senior economist for the UK & Europe at Aviva Investors.

One consequence of the global financial crisis has been rapid growth in public debt in most advanced economies. This is the result of governments being too complacent about their fiscal position before the crisis; and the cost of bailing out financial institutions, lower revenues, higher welfare spending, and slower economic growth ever since.

While a widespread deterioration in government finances would ordinarily be cause for concern, bond yields remain extremely low by historical standards almost everywhere thanks to the unprecedented actions of central banks. This has sparked a fierce debate among economists as to whether the size of deficits matters any more.

Classical economic theory contends that running large and persistent deficits is not sustainable over the long run. The functioning of markets will be impaired as higher interest rates begin to 'crowd out' private-sector investment, depressing economic growth. By creating a burden of indebtedness that is difficult for taxpayers to bear, deficits compromise the living standards of current and future generations. Left unchecked, the cost of debt servicing may spiral out of control, leading to a government's solvency being called into question.

However, others see less need for governments to get deficits under control given the world is continuing to shake off the effects of the financial crisis. Some Keynesian economists, such as Robert Skidelsky, have downplayed concerns over high debt levels,¹ while others, including Paul Krugman, have called on various governments to abandon 'austerity' policies.²

The apparent success of central banks in helping to keep bond yields under control in the face of large fiscal deficits has led some to conclude the

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Surprisingly little attention has been paid to the threat of sovereign default

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theory needs to be re-written. For now, financial markets – seemingly fixated on the power of central banks to keep bond yields low – appear largely unfazed by the worsening fiscal position facing many countries.

Yet debts and deficits do still matter. With the world economy enjoying its best period of economic growth since the crisis, governments with high debt loads would be well advised to get deficits under control since low rates of interest won't last for ever. In the majority of cases, worsening demographics underscore the need for action.

Global debt hits record

Surprisingly little attention has been paid to the threat of sovereign default in debates over policy, except in countries that lost market access at various points in the past decade, such as Greece. However, the International Monetary Fund on April 18 sounded the alarm when it argued a prolonged period of record-low interest rates had left the world more heavily indebted than before the financial crisis. It said countries needed to take “immediate action” to improve their finances before the next downturn.³

The fund pointed out that by the end of 2016 the world was sitting on a \$164 trillion mountain of debt, equivalent to 225 per cent of Gross Domestic Product (GDP), 12 points above the previous high in 2009. While China was responsible for much of that build-up of debt, the Washington-based institution also singled out the US for criticism. It warned President Donald Trump's package of tax cuts and spending increases was going to lead to a bigger budget deficit at a time when it should be on the way down.

Just days earlier, the US's own budget watchdog had warned of “serious negative consequences” from rising debt.⁴ The Congressional Budget Office said with the country heading for trillion-dollar annual budget deficits from 2020, US Federal Debt

owned by the public is set to rise to more than 96 per cent of GDP by 2028 – its highest level since World War II – from 76.5 per cent currently.⁵ That the Trump administration should be embarking on a huge fiscal stimulus when the US economy is in danger of overheating is highly unusual, flying in the face of economic doctrine. It is arguably reckless, too.

The mathematics of deficits

To assess whether public debt is on a sustainable path, it is possible to carry out simple simulations using the following equation:

$$d_t - d_{t-1} = \left(\frac{r_t - g_t}{1 + g_t} \right) * d_{t-1} + p_t$$

Where;

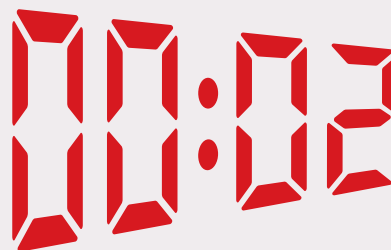
d_t = debt-to-GDP ratio in period t

d_{t-1} = debt-to-GDP ratio in period t-1

r_t = real interest rate in period t

g_t = real GDP growth rate in period t

p_t = primary budget balance as a % of GDP in period t



Essentially, the equation states that the change in a country's debt-to-GDP ratio between one year and the next depends on three variables: the real rate of interest, the real rate of GDP growth, and the primary budget balance (the government's fiscal position excluding interest payments). In simple terms, if a country's real economic growth rate does not exceed the inflation-adjusted cost of servicing its debt, it must run a primary budget surplus to keep its debt-to-GDP ratio stable.

By plugging in assumptions for interest rates and economic growth, we can use this equation to assess the fiscal positions facing eight countries. In the first simulation we assume real interest rates will remain close to zero and real economic growth will persist at what we estimate to be long-run trend rates.⁶



TICKING TIME BOMB

continued

Figure 1 shows the change in the primary budget balance (as a percentage of GDP) required by each country to keep its debt-to-GDP ratio stable. Positive figures imply tighter fiscal policy is required, while a negative number means there is scope for looser policy. As can be seen, on the basis of the above assumptions the majority of these eight countries actually have scope to loosen fiscal policy. Only in Japan is there a need for substantial tightening.

However, if we assume real interest rates rise to 2.5 per cent for each country – the historical average for G7 countries between 1965 and 2017⁷ – the situation gets appreciably worse, as figure 2 shows. Suddenly the majority of countries would have to tighten policy, in some cases substantially.

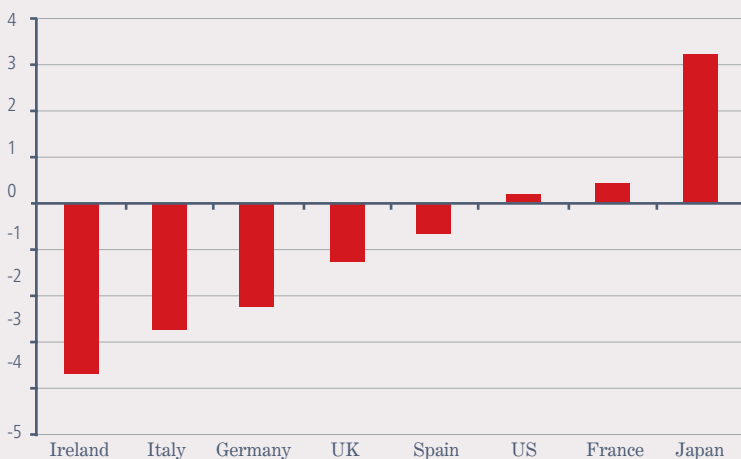
Furthermore, the second simulation is based on an assumption economic growth will continue at a relatively healthy clip. Should it disappoint, the required tightening could be greater. The recent loosening of fiscal policy in the US, which is not accounted for in the above simulation, makes the country's debt position even more precarious. The CBO reckons the annual deficit will average 4.8 per cent over the next decade, even with another 10 years of uninterrupted economic expansion.

Recessions can have a devastating impact on government finances as tax receipts drop and welfare payments rise. Figure 3 shows the extent to which some of these countries are still struggling to get debt under control, 10 years on from the global financial crisis, with Germany alone in avoiding a big increase.

Deteriorating demographics

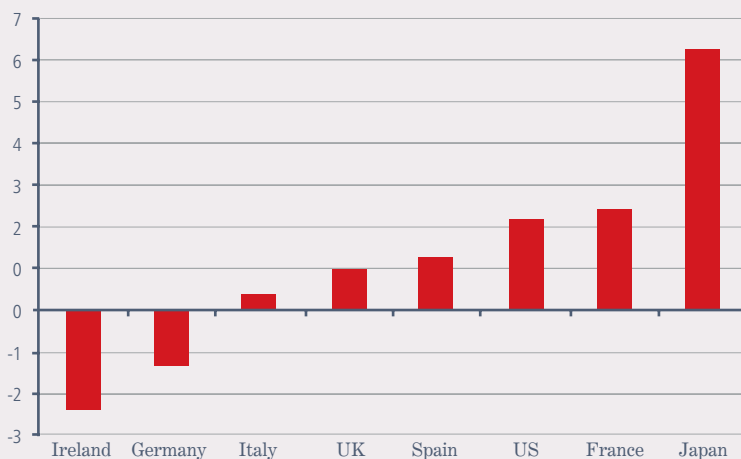
While the financial crisis wreaked havoc on many countries' finances, the deterioration has actually been going on for longer. Take the case of France, where last year the net public debt-to-GDP ratio hit 80 per cent. In 1985, the country

Figure 1: Primary budget balance as % of GDP: Simulation 1



Source: Aviva Investors

Figure 2: Primary budget balance as % of GDP: Simulation 2



Source: Aviva Investors

carried net debt equal to just eight per cent of GDP; by 2007, it had reached 32 per cent.⁸ While some of the rise in the two decades to 2007 was down to general fiscal profligacy, much was also down to a worsening demographic backdrop, the consequences of which the French government, like others around the world, has been slow to tackle.

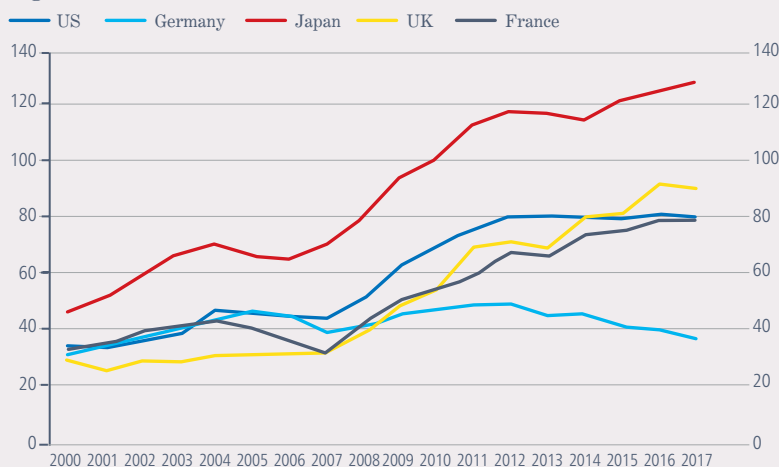
Figure 4 shows the old-age dependency ratio (people aged 65+ per 100 people aged 15-64) in 'high-income' countries more than doubled from 12.3 per cent in 1950 to 25.7 per cent in 2015. Assuming unchanged fertility and mortality rates,

the United Nations expects it to rise further, reaching a peak of 40.3 per cent in 2060.⁹

Perhaps more worrying in terms of its potential impact on government finances, the OECD in 2011 forecast that by 2050 the share of those aged 80 years and over in OECD countries will more than double to 9.4 per cent from 4.0 per cent in 2010.¹⁰

This will put further pressure on developed countries' finances for three reasons. Firstly, it is likely to hurt economic growth. Whereas between 1960 and 2000 the population of working age in the G7 rose by an average of one per cent

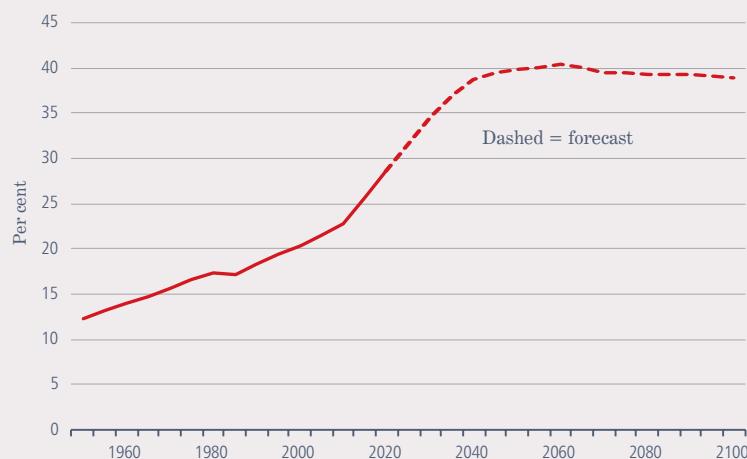
Figure 3: Public sector net financial liabilities as % of GDP



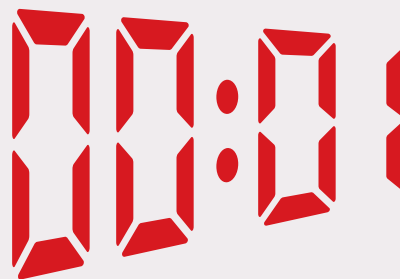
Source: OECD, Aviva Investors

“While most industrial nations recognise the need to tackle these issues, few have done so”

Figure 4: Old-age dependency ratio



Source: United Nations World Population Prospects, June 2017



a year, between 2018 and 2050 it is forecast to fall by 0.15 per cent a year.¹¹ This comes straight off growth. In other words, other things being equal, the trend rate of annual growth will be 1.15 per cent lower in the second of these periods than in the first.

Secondly, the cost of healthcare – used disproportionately by the elderly – has risen rapidly. In the US, the Centers for Medicare and Medicaid Services reckons national health spending – which includes spending by federal and state governments, the private sector and individuals – rose from just five per cent

of GDP in 1960 to 17.9 per cent in 2016. With health spending projected to grow one percentage point faster than GDP per year over the subsequent decade, it could rise to 19.7 per cent by 2026.¹²

Thirdly, many of these countries have covenanted to pay what now seem like overly generous state pensions. When national social security systems were established, their funding was calculated based on much shorter life spans. Despite most of these schemes being structured on a pay-as-you-go basis – in other words, funded from current taxation – pensioners have come to view their pensions as rights

based on the contributions they made during their own working life. That has made these entitlements virtually immune to political attack.

In a report published in March 2016, Citigroup analysts said an increase in the retirement-age population, accompanied by a decrease in the working-age population, was starting to put a strain on pay-as-you-go government pension schemes.¹³



TICKING TIME BOMB

continued

They estimated the total value of unfunded or underfunded government pension liabilities for 20 OECD countries had reached \$78 trillion, close to double the \$44 trillion published national debt number.

Longer life expectancies suggest either taxes will have to rise, in some countries' cases quite sharply, to pay for the pensions and healthcare costs of retirees, or those entitlements will need to be renegotiated. While most industrial nations recognise the need to address these issues, few have tackled the problem comprehensively. Most have engaged in piecemeal policymaking to mitigate the most pressing deficit problems. Although these measures provide some relief, more drastic action may soon be needed.

However, according to Gabriel Sterne, head of global macro research at economic forecasting group Oxford Economics, while it may be true that worsening demographics cause deficits to rise, it is unclear this will trigger as big a rise in real interest rates as some suggest. He points to Japan as evidence to support this view.

"Demographic changes have played a crucial role in pushing savings rates up and real rates down in the advanced economies. Despite some voices to the contrary, we think such forces will remain in place for many years to come."

Growth in a Time of Debt

In the immediate aftermath of the financial crisis, governments on both sides of the Atlantic pursued Keynesian stimulus programmes in an effort to stave off a repeat of the Great Depression. But it wasn't long before a number of economists and policymakers began to question whether these expansionary policies, which involved high levels of borrowing to finance additional government spending and tax cuts, should be continued or wound down to balance the budget.

Some, including UK Chancellor of the Exchequer George Osborne and Speaker of the US House of Representatives Paul Ryan, cited a 2010 paper entitled *Growth in a Time of Debt*, written by Carmen Reinhart and Kenneth Rogoff, as they looked to promote austerity policies. The US economists claimed rising government debt could seriously hurt growth. They found evidence economic growth was likely to turn negative when government debt rises above 90 per cent of GDP.¹⁴

Although Reinhart and Rogoff's findings were called into question in 2013 when a student at the University of Massachusetts discovered some flaws in their methodology,¹⁵ the debate as to whether or not large deficits impede economic growth continues.

Three competing theories

From a theoretical perspective, economists fall into three camps; two of which contend deficits don't matter and the third that they do. Arguably all three views can hold over different time horizons and at different moments in time, depending on the stage of the economic cycle.

The Ricardian equivalence proposition is an economic theory proposed by Harvard professor Robert Barro in 1974, building on the work of David Ricardo in the 19th century, as a means of refuting a key strand of Keynesian economic theory. It hypothesises financing government expenditures through taxes or debts is equivalent, since debt financing must be repaid with interest, and households, anticipating higher future taxation, would boost savings to leave total output unchanged. However, it seems highly unlikely people act in such a hyper-rational way in anything other than the extremely long run.

Ironically, the second camp to argue deficits do not matter comes from the opposite end of the ideological spectrum. A fundamental law of economic theory states savings must equal investment. But John Maynard Keynes said in some instances households' desire to save could exceed companies' wish to invest, even at a zero rate of interest. In other words, if interest rates cannot fall enough to 'clear the market', income must fall instead. That is why disciples such as Krugman and Joseph Stiglitz are unconcerned by deficits, and for much

of the past decade have instead called for governments to take up the slack by borrowing to pay for consumption. For them, the process can easily be reversed when economic activity recovers.

The third argument contends deficits do matter and will be viewed with concern by financial markets, at least in a 'normal' world that exists most of the time. In such a world, rising government deficits will not only lead to higher rates of interest, crowding out private-sector investment, but by misallocating scarce resources could also potentially lead to much higher inflation.

This is the world Reinhart and Rogoff based their research on. Unfortunately for them, the financial crisis struck just as they were producing their conclusions. Keynesians were able to argue against austerity by saying the 'normal' economic conditions they had based their conclusions on no longer applied. The world was saving so much that even real interest rates falling to zero were insufficient to prevent downward pressure on economic growth. The real interest rate that would have cleared the market was probably closer to minus three per cent.

Are we in a normal world yet?

Even if there were some errors in their work, Reinhart and Rogoff's fundamental conclusion – if the world is normal, and inflation is responding to interest-rate movements, then deficits matter – probably remains valid. Which begs the question: are we in a normal world yet, and if not, how close might we be to one?

At this juncture, the jury is still out. On the one hand, there is growing evidence inflation is returning and the world economy is moving out of the deflationary regime that has prevailed for the past 10 years. Should the removal of quantitative easing by central banks cause real interest rates to exceed real growth rates, the mathematics behind Equation 1 suggests many governments will need to tighten fiscal policy.

On the other hand, Germany, Japan and China are still producing a glut of savings; suppressing both real and nominal rates of interest around the world. If that situation were to persist, real interest rates may not rise very far and countries with high deficits could potentially rely on the

same arithmetic to reduce their debt-to-GDP ratios by generating modest economic growth.

After all, this was what the UK did after World War II. Having stood at 259 per cent in 1947, by 1991 the country's debt-to-GDP ratio had fallen to 22 per cent.¹⁶ Very little of the reduction was the result of a fiscal squeeze. Instead, for most of the period, economic growth exceeded interest rates.

No room for complacency

Of course, the danger in relying on such a strategy is the world goes back into recession. The US is on the verge of completing its ninth year of uninterrupted growth, a record bettered only twice – in the 1960s and 1990s – and close to double the 58 months average duration of the other 11 economic expansions since the Second World War.¹⁷ While it may be true recessions happen for a reason and not because they are overdue, the current expansion will end eventually. Were the world to go back into recession, it could have bleak implications for governments' balance sheets. The threat is compounded by the concern central banks will have limited scope to ameliorate the path of any downturn, since interest rates might well be lower than they have ever been at the start of a downturn.

Some commentators have suggested central banks could always print money to cancel their holdings of government debt. However, it is questionable how effective such a policy would be, which probably helps explain why the Bank of Japan (BoJ) has opted not to go down

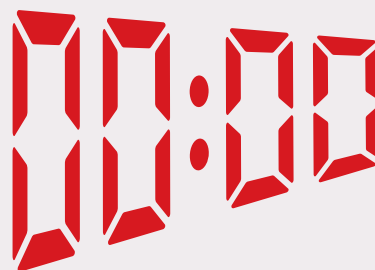
this route. If a central bank were to 'monetize' its debt in order to safeguard the government from default, the fear is this could lead to runaway asset price inflation and maybe even sharply higher goods and services inflation, with potentially disastrous consequences, as the currency was debased.

For now, even the BoJ appears to think the best way of getting the deficit down is by keeping r less than g . But in Japan's case, the process could take a century or more. Even then it is far from guaranteed to succeed given the country's demographic position.

While other advanced countries are in less dire straits than Japan, there is no room for complacency. True, the UK's experience in the post-war years showed it is possible to bring very high deficits back under control eventually. But the post-war years were characterised by high levels of productivity growth, which in turn fuelled strong rates of economic expansion. The poor productivity records of many advanced economies in recent years suggest a repeat may be hard to achieve.

Sovereign debt is generally regarded as the safest form of investment thanks to what is usually seen as a minimal risk of default. While investors do not appear to be calling Japan's solvency into question, it is unclear the country will ever be able to pay them back. Governments in other advanced countries with rising levels of debt and a worsening demographic backdrop would be advised to bear the Asian nation's recent history in mind ●

“*Recessions happen for a reason, not because they are overdue – but the current expansion will end eventually*”



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BOND BENCHMARKS: YARDSTICK OR CRUTCH?

Market indices are inherently inefficient. That can pose a problem for fund managers who rely too much on them as performance and risk benchmarks, explains Josh Lohmeier, head of North American investment grade credit at Aviva Investors.

As investment managers, we are in the business of helping clients meet specific investment objectives by delivering expected outcomes or rates of return. Those outcomes are not necessarily tied to a benchmark, but benchmarks are useful as a yardstick to measure how effective managers are.

One way investors and managers use benchmarks to gauge performance is by measuring tracking error, or how much a portfolio's return deviates from its benchmark return over a specific period. Too often, tracking error is viewed as the level of risk a manager takes in pursuit of the portfolio's stated investment objectives. However, what it really measures is the portfolio's deviation from the benchmark allocations: this may mean the portfolio has more or less risk than the benchmark.

Tracking error can be useful to assess how much and where active investment managers' portfolios deviate from benchmark allocations. But some managers rely too much on tracking error to the extent it becomes more of a crutch; they let an outside index dictate many portfolio decisions out of fear of deviating too far from benchmark returns, rather than turning to their own best ideas and investing with conviction.

Tracking error can be a helpful gut-check of portfolio deviations relative to a chosen benchmark, but it is important to be aware of its limitations. Credit managers should

develop other tools for measuring and allocating risk in the portfolio construction process, ones that are less reliant on tracking error and more focused on portfolio volatility.

Missing the mark

One problem credit managers face in benchmarking is the inefficiency of bond indices, due primarily to the size and structure of fixed income markets. Looking at US markets in particular; bonds are largely traded over-the-counter, which can make price discovery difficult and lead to wide variability in price changes. Liquidity can also be a concern, especially in the recent period of low interest rates. Bond investors have not been too concerned with liquidity during the quantitative-easing years, with major central banks conducting massive purchase programmes in specific areas of the market. However, once the Federal Reserve and other central banks curtail their indiscriminate bond-buying sprees, the inefficiencies of bond indices could become more apparent.

Bond indices also have a weighting problem. With equity indices that are weighted by market capitalization, such as the S&P 500, size is largely determined by market prices with the best-performing companies often providing the most influence on the index. With bond indices, size is related to the amount of the outstanding debt; the biggest components

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Managers need other tools besides tracking error to help them allocate risk

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in the index are issuers who are heavily indebted or highly leveraged. This may not necessarily be a problem; many of these firms may be well managed and have strong balance sheets, especially in the investment-grade market. But more debt is generally associated with more risk, so issue size in bond indices can create inefficiency.

The inefficiencies of bond indices may pose a thorny problem for credit managers who focus too much on tracking error. If benchmarks are inefficient, deviating from them should in theory be a good thing, resulting in either lower risk or better returns. However, the opposite is often true — managers try to stay close to their chosen benchmark and variations from this are viewed as taking on extra risk, with little focus on the total beta (or volatility) in the portfolio relative to the benchmark.

Tracking error: The good and the bad

Let's consider two ways credit managers use tracking error, to both good and bad effect. First, a manager who is too benchmark-focused and wants to reduce tracking error may hold a security they have a negative outlook on just because it represents a large part of the portfolio's benchmark. Perhaps the manager shows disfavour by underweighting the issue in the portfolio, but they still own the security

even if it falls outside of their best ideas. In this case, we would view reducing tracking error as bad; the manager may succeed in lowering their tracking error by sticking closer to their benchmark, but the security may not contribute much of anything to excess returns and could even serve as a drag on overall performance.

Second, let's look at the flip side, when adding it can be good for portfolio returns. In this example, a manager may avoid an issue where they hold a negative outlook and look for a different opportunity that presents similar levels of risk and volatility. Deviating from the benchmark in this manner would be considered 'taking on risk' because it adds tracking error. But if the decision works out as the manager intends — in other words, if avoiding the disfavoured security successfully minimises losses and favouring a better idea contributes positively to performance — the result should be better risk-adjusted returns, even if tracking error is higher.

Ultimately, clients are better served by managers who develop robust risk allocation processes, construct portfolios thoughtfully with their best ideas, and invest with conviction.

Building a better benchmark

Every investment manager, in credit or other asset classes, follows a process for building portfolios and allocating risk.

When reviewing these managers and their different processes, investors should ask each an important question: does your process deliver higher returns for less risk or the same returns for a lower risk profile than stated benchmarks? This is the definition of 'alpha'. Put another way, if a manager only manages to outperform when markets rally, there is a much higher probability they are merely adding beta to achieve excess returns.

An ideal portfolio construction process would accomplish higher returns for less or similar risk, while providing consistent risk-adjusted returns in all market environments, not just when markets are rallying. Achieving this goal would likely require a more complex approach than the usual 'bottom-up' credit review and due-diligence steps. Bottom-up or top-down constructions are not wrong necessarily, but may not be enough to provide excess returns over the course of a full credit market cycle. A more sophisticated approach may uncover sources of additional alpha that a simplistic approach would likely overlook.

Managers need other tools besides tracking error to help them allocate risk during portfolio construction. If a credit manager can throw off the crutch of tracking error and use it more as a yardstick, they could focus their efforts on seeking better risk-adjusted returns and minimizing volatility ●

THE NEXT FRONTIER

Frontier market bonds have not escaped a torrid few months for emerging markets, with yields spiking and prices falling. These bonds still have an important role to play in investors' portfolios – but selectivity and active management are vital.

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Investors must be discerning if they are to take advantage of opportunities in frontier market debt

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The first half of 2018 has given investors in emerging market bonds pause for thought, with turbulence in larger countries such as Argentina and Turkey causing a reassessment of risk across the EM universe.

So-called frontier markets have been caught in the storm, perhaps unsurprisingly given their idiosyncratic nature and often misunderstood stories, resulting in exaggerated price action – yields on government bonds from Ecuador, Iraq, Tajikistan and Ukraine have all widened between 100 and 200 basis points in recent months amid concerns over rising fiscal deficits. However, frontier markets are not homogenous and the recent volatility could present significant opportunities.

Within the broad emerging market universe, frontier markets are typically smaller, sub-investment grade and less accessible than larger emerging markets. To be eligible for inclusion in NEXGEM – a subset of JP Morgan's Emerging Markets Bond Index Global (EMBIG) – the country must have a rating of Ba1/BB+ or lower from Moody's and S&P, and cannot be a European Union member or be in the process of seeking EU membership.

Frontier market issuers tend to be among the fastest growing economies in the world, and many are also making strides in improving their governance standards. These favourable characteristics have been reflected in the total returns of the NEXGEM – as of June 4, 2018, the index had returned 22.2 per cent over three years; 47.6 per cent over five years; and 122.9 per cent over 10 years.¹ By contrast, EMBIG delivered 14 per cent, 22 per cent and 87 per cent over the same periods.

Still, investors must be discerning if they are to take advantage of the opportunities. Argentina is clearly a very different economy from Iraq or Tajikistan.

And external forces – including the shifting nature of institutional financing, the rise of China, and fluctuating commodity prices – are causing frontier markets to become differentiated as never before. Understanding the impact of these forces will be crucial for debt investors hoping to successfully navigate the frontier.

IMF support: this time it's different

Take the role of the International Monetary Fund (IMF). When Argentina's President Mauricio Macri announced in May that he was seeking support from the IMF,² credit investors could be forgiven for feeling a sense of déjà vu; after all, the country has sought IMF help more than 20 times over the last 60 years. But where an application for IMF support would once have been a warning sign, it is now increasingly taken as an indication that a country is willing to get its fiscal affairs in order.

Credit rating agency Fitch has undertaken extensive analysis of how IMF support affects the creditworthiness of frontier markets. In a report from February 2018, it noted there has been a sharp increase in the number of sub-Saharan African countries receiving money from the IMF in recent years.³ By the end of 2017, nine out of the 21 countries in the region rated by Fitch were in active IMF programmes, up from just three in 2014.

The increase in IMF activity is a sign of the economic shocks these countries have faced in recent years, but it also points to a growing willingness among African governments to implement the kind of painful yet beneficial macroeconomic adjustments the IMF advocates. The nuance for credit investors, as Fitch notes, lies in the details of the individual programmes each country has with the IMF.

"The ability of IMF arrangements to support sovereign creditworthiness ultimately depends on each country's characteristics, including macroeconomic fundamentals; the quality of institutions and governance; political set-up; and, above all, the strength of commitment to the implementation of the required adjustment," wrote Fitch in its report.

IMF programmes are now seen as an advantage by many investors, as long as the governments involved prove their commitment to making the necessary adjustments. "From our perspective, when countries approach the IMF, they are potentially moving to more proactive economic policies. Now they don't have to wait until there is a balance of payments crisis," says Aaron Grehan, emerging market debt fund manager at Aviva Investors in London. "IMF involvement is very important as it limits potential losses for bondholders. But it is more than just financial assistance; it is the policy, reporting and other support that helps."

China: the new creditor

Another significant change to the frontier market universe is that the IMF is no longer the only game in town. China's rise as an exporter of capital has added a fascinating new dimension to the credit analysis of frontier markets.

"China is now providing a lot of money to frontier markets, especially those in Central Asia and Africa," says Ed Parker, head of EMEA Sovereign Ratings at Fitch in London. "But there is not a lot of transparency over the total amount of financing Chinese development banks provide to these countries."

China's economic assistance to frontier markets differs markedly from IMF or World Bank support. Firstly, the money tends to be

project finance, as opposed to government finance; sourced from institutions such as the China Development Bank and the China Export Import Bank (neither of which disclose many details about their activity). Lending tends to be conditional on projects being carried out using Chinese material and labour.

According to Carmen Altenkirch, emerging market sovereign analyst at Aviva Investors in London, the scale of Chinese involvement in many frontier economies is huge. For instance, 28 per cent of all of Zambia's external debt is held by China. "Countries such as Angola, Ecuador, Pakistan and Zambia have seen significant lending from China," she says. "But many of these countries are now asking to renegotiate the loans either through lower coupons or longer maturities because they are struggling to repay."

An example of this dynamic was recently revealed in parliamentary proceedings in Kenya. In May 2014, China lent Kenya Sh324 billion (\$3.2 billion) to build a new railway line from Nairobi to Mombasa.⁴ The 15-year debt had a grace period of five years. Proceedings at the Kenyan National Assembly showed that annual repayments

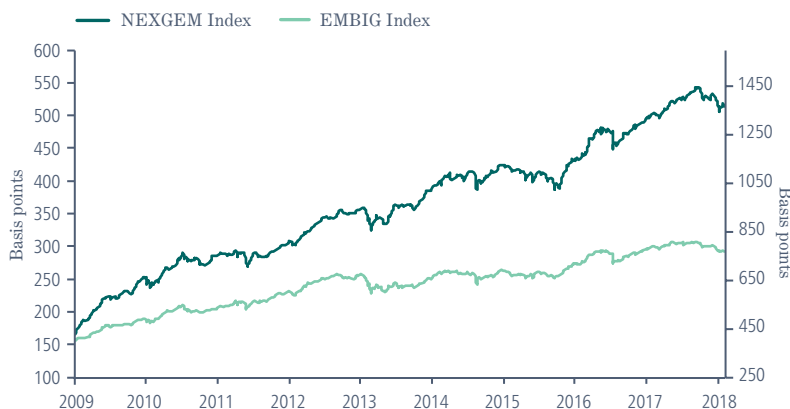
on this debt will increase from Sh6 billion to Sh35 billion over the next year. Over the same period, total debt payments to Chinese lenders will increase from Sh26 billion to Sh82 billion. Other African countries face similar increases in debt repayments to China.

This raises several questions: how will China behave as a creditor; will it allow accommodation on debt repayments in order to secure good bilateral relations with strategically-important countries or will it play hardball? China is not part of the Paris Club of creditor nations, so there is little visibility on how it will proceed. As with the IMF, it is likely each country will be treated differently, adding a further element of specificity to the credit drivers of each frontier market for investors to consider.

The frontier expands

A further shift in the frontier-market environment is that there are many more international issuers than were present in the previous cycle. Furthermore, a number of countries have multiple international debt issues outstanding.

Figure 1: Total returns NEXGEM vs EMBIG



Source: JP Morgan, 2018.

Past Performance is no guarantee of future results. Indexes are unmanaged, and one cannot invest directly in an index. They do not reflect any fees, expenses, or sales charges.

THE NEXT FRONTIER *continued*

According to Parker at Fitch, many debut sovereign issuers have accessed the international debt markets with varying degrees of success over the last decade, including Ghana, Mongolia, Senegal and Tajikistan. “This reflects the hunt for yield among investors, but also the fact these countries have been growing quickly, which allows them to borrow more,” he says.

Ghana is a good case study of a country that has borrowed successfully. In mid-May, the country issued \$1 billion of 10-year bonds, carrying a coupon of 7.625 per cent, and \$1 billion of 30-year bonds,⁵ which have an 8.625 per cent coupon. The combined issuance generated \$7.5 billion of demand, and added to four other outstanding bonds, one of which came with a 10.75 per cent coupon and a World Bank guarantee. The country now has the trappings of a solid sovereign issuance programme with a yield curve and a debt management office – all of this undertaken while it is in an IMF programme.

Ghana has joined other countries such as Ivory Coast, Kenya and Senegal in tapping the 30-year end of the curve. Ivory Coast and Senegal (as well as Egypt) have added further diversification to the market by completing debut issues denominated in euros. Such a plethora of bonds compels investors to be selective – especially as many of the debut Eurobonds will need to be either refinanced or redeemed over the next few years. Not all issuers will be able to complete this process smoothly.

“Zambia in 2012 was able to issue a Eurobond with a coupon of just 5.375 per cent, but since then there has been a significant increase in the price it has had to pay,” says Altenkirch. “You have to differentiate between frontier markets now, especially in terms of their capacity to refinance their existing issues, because many of these countries will have to redeem their first Eurobonds in the early 2020s.”

Commodity prices and credit ratings

Countries’ capacity to redeem these debts will be dictated to a large extent by the availability of foreign revenues, which will depend on export revenues – often derived from natural resources – or the presence of internal buffers such as dedicated reserves or a sovereign wealth fund.

Frontier market economies tend to be tethered to commodity prices in a way that diminishes further up the development curve. For nations such as Mongolia (copper) and Ivory Coast (cocoa), this dependence can seem almost umbilical. Many frontier market economies suffered badly during the 2015-2016 commodity-price slump. Now that prices are recovering, their prospects are brighter, but there is still a high level of dependence on commodity exports for both growth and the foreign exchange necessary to repay their debts.

According to Parker at Fitch, many frontier markets were downgraded between 2015 and 2017 due to the collapse in commodity prices. In Fitch’s overall sovereign rating model, commodity prices only account for two per cent of the total inputs. But the dependence of these economies on commodities feeds through into many other metrics that influence their rating.

A fall in commodity prices leads to a fall in reserves, an increase in overall government debt and a fall in the value of the currency. Cumulatively, these dynamics can quickly and severely impact the external credit of frontier economies. “Commodity price slumps can lead to big macro impacts for these countries,” says Parker. “This dependence makes them more vulnerable to shocks.”

Credit ratings are another key factor. An upwards ratings trajectory can transform a country’s prospects and provide a tailwind

for their bonds. An exercise undertaken by Aviva Investors involves looking at the macro inputs that could lead to an upgrade – such as the per-capita income of a frontier market, its total government debt, and the rate of improvements in its governance metrics – and then using GDP growth as a proxy to gauge how long it would take for it to achieve parity with established EM economies.

Being selective

With these factors in mind, it would seem investors need to find credits that have good support from the IMF or China; sufficient external buffers to withstand commodity shocks; and a manageable debt burden that is administered in an institutional way. This actively reduces the potential number of issuers that are investable.

What is certain is that it pays to be rigorously selective when investing in frontier market bonds, as in any other asset class. Most of the returns will be derived from actively finding the best credits while avoiding cyclical losses. What is often considered a ‘high-beta’ play on the wider emerging market asset class is actually more of an uncorrelated alpha generator. Above all, investors need to do their homework, commit to the long term and – perhaps most crucially – have the stomach to brave the kind of volatility that has roiled emerging markets over the past few months ●

“*Investors in frontier markets need to do their homework and commit to the long term*”

- 1 JP Morgan NEXGEM index, June 2018
- 2 ‘Argentina begins talks with IMF over financial aid’, *Financial Times*, May 2018
- 3 ‘IMF programmes in Africa and the implications for creditworthiness’, Fitch Ratings, February 2018
- 4 ‘Kenya inaugurates Chinese-built railway linking port to capital’, *Reuters*, May 2017
- 5 ‘Ghana sells \$2bn Eurobonds at issuer-favoured yield’, *Reuters*, May 2018

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