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## The rise and rise of sustainable investment

Sustainable investment, once the province of the do-gooder, has entered the investment mainstream. From pension fund pitches to exchange-traded fund launches, 'green finance' has emerged over the past two years as a common ingredient of much successful fund marketing. A new collection of essays on this theme – *'The perfect storm: navigating the sustainable energy transition'* – has become required reading beyond firms' environmental, social, and governance teams. Its team of lead authors and editors speaks to the confluence of professional, political and academic thinking: Alexander Van de Putte, professor of Strategic Foresight at IE Business School, one of Europe's top academies; Dr Keirat Kelimbetov, governor of the Astana International Financial Centre (and a former deputy Prime Minister of his country); and Ann Holder, chief editor at the Sustainable Foresight Institute.

The term 'green finance' is used to refer to financial instruments, services or activity which result in positive change for the environment and society over the long term. Often this is linked to positive changes to greenhouse gas emissions. Marissa Blankenship of Allianz and Richard Burrett from Cambridge University, two of Professor Van de Putte's chief collaborators on the book, assess some key issues overleaf.

The drive to green finance is being driven by investor demand; ambitious societal objectives (such as the Paris agreement and the Sustainable Development Goals); the rise of new financial instruments (such as green bonds); and improved understanding of risk through enhanced analytics and reporting.

But how big is it, how big will it become? The team behind the long-standing Global Financial Centres Index is now building a Global Green Finance Index (GGFI) in an initiative from Long Finance in association with Finance Watch and the Mava Foundation. The GGFI is designed to shine a light on green finance activity by ranking the world's financial centres on the quality and depth of their green finance offerings. The index is being constructed using a number of existing indices in combination with a survey of senior sector figures from around the world.

The intention behind the GGFI is to:

- Define green financing and green finance criteria.
- Enable financial centres to enhance the range and depth of their offerings.
- Showcase and share best practice in green financing.
- Create a 'race to the top' which will catalyse the growth of green finance, improve policymakers' and other stakeholders' understanding of what makes a financial centre 'green' and shape the financial system to support sustainability goals.

This initiative is being conducted under the leadership of Professor Michael Mainelli, Chartered FCSI, Executive Chairman of Z/Yen. For further information on the project, please contact his colleague Mark Wardle at [mike\\_wardle@zyen.com](mailto:mike_wardle@zyen.com)

## Managing uncertainty

The CISI is delighted to be involved in a major long-term project with Britain's Open University and the University of Regensburg in Germany, on how financial professionals can best organise their learning strategies in times of uncertainty. The project is investigating the workplace learning strategies of finance professionals faced with unprecedented levels of economic, market, and political unknowns. For many reasons, including but not limited to the post-Brexit landscape, the financial sector in the UK faces more significant uncertainties than at any time in its history. Despite the uncertainties and ambiguities, though, the financial sector considers the knowledge and skills of people as its most valued asset.



### Key project questions

- How do finance professionals shape their work in uncertain times?
- What is the nature of uncertainties faced by finance professionals?
- How can active work behaviour in the finance sector be measured on the individual level?
- How can technology be used to scaffold professional learning activities during times of uncertainty?

This work is part of a larger research partnership involving The University of Regensburg (Prof Dr Regina Mulder and Ms Leonie Beatrice Jacob) and The Open University (Professor Allison Littlejohn and Ms Vasudha Chaudhari). To get involved or find out more, contact Ms Chaudhari – see page 70.

## The year of economic crime

Governments, law enforcement agencies and regulators around the globe are zeroing in on economic crime: market abuse; money laundering; tax evasion. Exchanges of bank account data between almost all countries have multiplied in the past year under the common disclosure rules. Regulators in Europe – including Britain's FCA – have given clear indications that, with the onslaught of regulation in our sector, MiFID II, GDPR, et al, they will try to be in listening mode for the rest of 2018 when it comes to minor infringements. But on crime they will be most robust in their approach.

The programme for this year's Cambridge International Symposium on Economic Crime – the 36th, and now the biggest gathering of its kind in the world – has a special focus designed by and for financial services professionals, including anti-financial crime, compliance, legal, audit, information security and risk management staff, regulators, law enforcement and other professionals. See [crimesymposium.org](http://crimesymposium.org) for further information.

The Symposium exemplifies the convening of professionals and academics to mutual benefit – as is, on a smaller but no less significant scale, the paper starting overleaf, co-written by a distinguished financial services professional and an eminent Cambridge University Fellow. The next issue of *Review of Financial Markets* will have a special feature on the changing approach to economic crime. As ever, comments and suggestions are most welcome.

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FINANCING THE SUSTAINABLE ENERGY TRANSITION<sup>1</sup>

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The year 2016 was a tremendous one for the commitment to sustainable finance following the success of the Paris Agreement Conference of Parties 21 (COP21) 2015 and the launch of the Sustainable Development Goals (SDGs).

While the green financial system is in its nascent stages, the combination of government guidelines and commitments as well as interest from issuers and investors demonstrates a willingness to create the financial infrastructure necessary to fund the transition to a low-carbon economy. A range of initiatives from public and private sources have launched which should support the shift from niche to mainstream financing, including China's *Guidelines for establishing a green financial system*, France's commitment to issue a sovereign green bond, recommendations from the G20 Green Finance Study Group to scale up capital for green investment, and the development of green stock exchange platforms. Green finance infrastructure, however, will not be enough as it currently stands to deliver the 70%–80% of the financing supply that will be required from the private sector.

This paper investigates the risks and limitations of the current approach to financing the transition to a sustainable energy future and proposes alternatives, which include a differentiated cost of capital for low- versus high-carbon industries.

## Market momentum is growing

The ability to transition to a less resource-intensive global economy is dependent upon green finance instruments. Green finance involves efforts to internalise environmental externalities and adjust risk perceptions to boost investments that will aid the transition to a low-carbon economy and mitigate the risks from climate change.<sup>1</sup> Green financing, in particular green bonds, has strong support from the public sector. It is estimated that the total green bond market size at the end of the 2016 was \$192bn, however the majority is publicly funded.<sup>2</sup> To make the transition to a low-carbon economy, substantial investment is needed to sustain the momentum from 2016 to finance renewable energy, energy efficiency and clean technology.

Decarbonising by changing the world's energy system and adapting infrastructure are the largest financing hurdles. Estimates by the United Nations Environment Programme – Finance Initiative (UNEP FI) suggest that \$35tn is needed between now and 2050 to finance the sustainable energy transition.<sup>3</sup> While the Global Commission on Energy and Climate estimates that \$90tn in investment is needed to adapt both man-made infrastructure and natural infrastructure over the next 15 years and to meet this challenge the pace of infrastructure investment needs to double to an average of \$6bn per year by 2030.<sup>4</sup> Furthermore, the risks

due to climate change are not isolated to transition, physical and liability risks but investment will also be needed to address the disruption to social systems.

Carbon markets have expanded since the EU introduced the Emissions Trading Scheme in 2005. This caps the total amount of carbon dioxide, nitrous oxide and perfluorocarbons and limits emissions from 11,000 heavy industries and airlines in 31 countries. By 2020, emissions from covered sectors should be 20% lower than in 2005 and 30% lower by 2030.<sup>5</sup> Other national and regional schemes existing or under development include those in China, California, and Japan, but through Article 6 of the Paris Agreement a more ambitious international market mechanism could come into force. According to the Organisation for Economic Cooperation and Development (OECD), carbon prices are about 80% lower than required to protect the climate, and in their analysis of six industries in 41 countries, emission costs through fuel taxes or trading systems need to rise to at least \$34 a metric ton. Currently, 90% of global emissions are taxed or priced below \$34 and 60% of emissions are not priced at all.<sup>6</sup>

Clean technology is a fragmented market with each technology attempting to respond to the challenge of creating a clean future but at varied stages of adoption. Bloomberg New Energy Finance counted, as of 2015, more than 600 publicly-held companies worldwide in the clean energy value chain, with at least moderate corporate exposure to renewable energy or smart technologies.<sup>7</sup> This transformation has led to new installations of renewable energy overtaking conventional power for the first time in 2015 to 153 gigawatts (GW), or 55% of new installed capacity, thus exceeding coal for the first time.<sup>8</sup> Investment in renewable energy sources such as wind, solar and other clean technologies such as smart grids, storage and electric vehicles is expected to represent about 5% of global GDP for 2016, or approximately \$3.8tn.

Global green bond issuance topped \$100bn in 2017 surpassing the issuance volume of 2016. Poland issued the first sovereign green bond in December 2016 but during 2017, France became the second nation to issue a sovereign green bond with a €7bn issue in January, and Fiji emerged as first Pacific Island nation and emerging economy to issue a sovereign green bond. Nigeria became the fourth country globally and the first African nation to issue a sovereign green bond in December 2017. The issuer universe continued to grow but market insiders see much more potential for banks and corporates to lift green issuance. In response to Paris Agreement commitments, perhaps there has been increasing focus on green city bonds, resilient infrastructure and alignment with national climate targets.

### The role of financial institutions

Financial institutions represent only about 4% of total outstanding green bond issuances and this picked up ahead of COP21. Banks have primarily focused on financing renewables and green buildings; however, there is a significant challenge in data management and project reporting, thus reinforcing the need for governments and investors to agree on common standards for green bonds and other financing tools. Financial institutions are in competition with development banks such as the European Investment Bank (EIB) and KfW (German Development Bank), which have attractive financing facilities for green activities, and which may undermine the attractiveness of funding through green bonds.

Typically viewed as being on the periphery, products and services affiliated with sustainability, but not necessarily in a traditional green context, are also increasing. Measures to finance a sustainable energy transition should not be at the detriment of investment in social finance and financial inclusion. Replacing the Millennium Development Goals, the launch of the SDGs in September 2015 provided a call to action for the private sector to play a fundamental role to end poverty by 2030. This critical roadmap consists of 17 goals and an estimated investment of \$5–\$7tn per year including investment in infrastructure, clean energy, sanitation and agriculture.<sup>9</sup> One approach is through impact investing where assets under management increased from \$25.4bn in 2013 to \$35.5bn in 2015, representing a compound annual growth rate of 18%.<sup>10</sup> Over 60% of investment was allocated to emerging markets, with 70% allocated through private debt and private equity and with the highest allocations to microfinance, other financial services and energy. Moreover, in October 2015, a group of banks and investors launched a new financing paradigm called the Positive Impact Manifesto, calling for an impact-based approach to investing where businesses, financial institutions and their counterparts in the public sector, and civil society work collaboratively to develop new business models and financing approaches to help address the SDG funding gap.<sup>11</sup>

### The role of global integrated frameworks

Governments and investors agree that the sustainable energy transition will require a financial system that is based on common standards. For the green finance market to develop for the long term, this will require that companies develop a disclosure baseline and then consistently report data on environmental factors including carbon emissions, air, water and land pollution, energy savings, and water intensity. Poor public disclosure makes it difficult for investors to measure their exposure to climate risk. Companies in India and China have a particularly steep curve ahead to increase disclosure of greenhouse gas emissions. According to Sustainalytics, only 15 of 71 Chinese companies under coverage report this data.<sup>12</sup>

Public companies often cite that they do not receive enough demand from stakeholders to invest in tracking and reporting environmental, social and governance (ESG) information on a regular basis.<sup>13</sup> Investors, on the other hand, cite their commitment toward ESG integration through the 1,500 signatories to the United Nations-sponsored Principles for Responsible Investment (PRI) which represents \$62tn in assets under management (AUM) or 50% of the total global institutional asset base.<sup>14</sup> Furthermore, Bloomberg has seen the number of investors on its integrated platform accessing ESG data increase from 1,545 users in 2009 to 12,078 users in 2015, indicating a 680% increase over a six-year period.<sup>15</sup>

There is an immediate need for investors, especially the signatories of the PRI who have committed to active ownership and to seek appropriate disclosure on ESG issues by the entities in which they invest, to engage with companies who inadequately address the transition to the low-carbon economy in their strategy as well as encourage companies to use the available resources for reporting consistent and comparable ESG information. There is a distinct opportunity to transform this current scenario into one where capital markets reward sustainability performance with capital and credit and there are multiple initiatives and frameworks available to companies, which define what is needed to ensure that the right ESG information is consistent and comparable for investors.

### Marissa Blankenship

Marissa Blankenship is a senior ESG analyst with Allianz Global Investors, which she joined in 2011. As a member of the firm's environmental, social, and governance team, she is responsible for research and engagement on companies in the financial and real estate sectors. Marissa also serves on the advisory committee to the Sustainable Stock Exchanges Initiative, Investor Working Group. She has spent over ten years in sustainable finance, with prior roles in developing an impact investment fund of funds and as an adviser to a microfinance fund at Incofin Investment Management. Marissa started her investment career in the equity strategies group at Hall Capital Management in San Francisco.

Marissa holds a BS in Economics from the University of California, Davis. She also holds an MSc in Latin American Economic Development from the University of London and a Masters in Sustainability Leadership from the University of Cambridge.

### Cooperation between exchanges and regulators

To meet the ever-growing need for ESG data, international cooperation between regulators and stock exchanges is needed to ensure that guidelines, listing rules and frameworks are harmonised. The plethora of frameworks and initiatives currently available evidence the importance of providing ESG criteria. While it is not mandatory in most markets to disclose ESG information, projects such as the Sustainable Stock Exchanges (SSE) initiative have been successful in promoting the dialogue on best practice in ESG reporting. Approximately 60 stock exchanges to date have joined the peer-to-peer learning platform for exploring how exchanges can enhance corporate transparency and ultimately performance on ESG issues and encourage sustainable investment.<sup>16</sup>

Apart from encouraging companies to enhance ESG reporting, stock exchanges have a critical role to play in advancing the green bond market. The 11 stock exchanges that currently list green bonds, including Johannesburg, London, Luxembourg, Oslo, and Shenzhen, have made an important contribution to green finance by defining the basic rules of the market and fostering innovative green finance products. However, more stock exchanges need to be involved in listing green bonds as well as educating issuers and investors on climate risk disclosure, promoting green products and services, and introducing listing rules for green bonds.

In addition to ESG guidance from stock exchanges, voluntary reporting frameworks have evolved as the importance of material ESG factors has developed. Trendsetters in the industry include the Equator Principles (EP), Carbon Disclosure Project (CDP), the Global Reporting Initiative (GRI), and Integrated Reporting. The Equator Principles have become a market standard for financial institutions in the assessment and management of environmental and social risk in project financing. More than 80 banks have adopted EP and use their standards in their due diligence process and reporting on the infrastructure projects they finance, many of which are in the energy sector.

The CDP has played a key role in socialising climate risk among investors over the past 15 years and has created a system upon which investors can engage with companies on environmental issues including climate change, water scarcity and deforestation. More than 5,600 companies respond to the questionnaire and investors representing over \$100tn in

1. [http://unepinquiry.org/wp-content/uploads/2016/09/Synthesis\\_Report\\_Full\\_EN.pdf](http://unepinquiry.org/wp-content/uploads/2016/09/Synthesis_Report_Full_EN.pdf).

2. Oriith Azoulay et al., 'Green bonds 3.0: quality check,' 2017.

3. <http://www.unepfi.org/climate-change/climate-change/>

4. [http://newclimateeconomy.report/2016/wp-content/uploads/sites/4/2016/08/NCE\\_2016\\_Exec\\_summary.pdf](http://newclimateeconomy.report/2016/wp-content/uploads/sites/4/2016/08/NCE_2016_Exec_summary.pdf).

5. [https://ec.europa.eu/clima/policies/ets\\_en](https://ec.europa.eu/clima/policies/ets_en).

6. <http://www.oecd.org/tax/carbon-pricing-efforts-are-falling-short-but-even-modest-collective-action-can-deliver-significant-progress.htm>.

7. [https://data.bloomberglp.com/bnef/sites/4/2016/01/Clean\\_Energy\\_Investment\\_Factpack.pdf](https://data.bloomberglp.com/bnef/sites/4/2016/01/Clean_Energy_Investment_Factpack.pdf).

8. <https://www.iea.org/newsroom/news/2016/october/medium-term-renewable-energy-market-report-2016.html>.

9. [http://www.ohchr.org/Documents/Issues/Business/ForumSession4/SDGs\\_UNPGs\\_14oct.pdf](http://www.ohchr.org/Documents/Issues/Business/ForumSession4/SDGs_UNPGs_14oct.pdf).

10. [https://thegiin.org/assets/GIIN\\_Impact%20InvestingTrends%20Report.pdf](https://thegiin.org/assets/GIIN_Impact%20InvestingTrends%20Report.pdf).

11. <http://www.unepfi.org/fileadmin/documents/PositiveImpactManifesto.pdf>.

12. [https://www.researchgate.net/publication/310503419\\_ESG\\_Spotlight\\_China\\_leaps\\_ahead\\_at\\_G20\\_A\\_carbon\\_market\\_on\\_the\\_horizon\\_6\\_September\\_2016](https://www.researchgate.net/publication/310503419_ESG_Spotlight_China_leaps_ahead_at_G20_A_carbon_market_on_the_horizon_6_September_2016).

13. Wendy Stubbs and Paul Rogers, 'Lifting the veil on environment-social-governance rating methods,' *Social Responsibility Journal*, 9(4): 622–640, 2013.

14. <https://www.unpri.org/about>.

15. [https://data.bloomberglp.com/sustainability/sites/6/2016/04/16\\_0404\\_Impact\\_Report.pdf](https://data.bloomberglp.com/sustainability/sites/6/2016/04/16_0404_Impact_Report.pdf).

16. <http://www.sseinitiative.org/wp-content/uploads/2012/03/SSE-Report-on-Progress-2016.pdf>.

assets are requesting this detailed environmental disclosure.<sup>17</sup> The CDP is also aiding companies to look beyond the environmental impact of their own operations to the environmental impact of their supply chain, where according to the founder of the CDP, Paul Dickinson, the world could see a predictable industrial revolution as there are vast efficiencies to be gained from the greening of supply chains.<sup>18</sup>

Similarly, the GRI, started in 1997 by the Coalition for Environmentally Responsible Economies (CERES), has evolved into a set of standards that help companies to undertake sustainability reporting of material economic, environmental and social issues. About 82% of the world's largest 250 corporations use GRI to report on their sustainability performance.<sup>19</sup> For companies who have already embedded sustainability into their strategy and are able to quantify the financial impact, the Integrated Reporting framework enables them to present a comprehensive view of how value is created over time as measured by how various capital – such as financial, manufactured, intellectual, human, social and relationship, and natural – increase, decrease or transform as a result of an organisation's business activities and outputs.<sup>20</sup>

Some of the most powerful tools in the ESG integration debate have been developed from research assessing important energy transition hurdles, such as the systemic risk of a carbon bubble leading to stranded assets and the resultant impact of fossil fuel divestment. Carbon Tracker, an independent financial think tank, has been instrumental in bridging the gap between capital markets and climate change by defining the term 'stranded assets' or capital expenditures which may be allocated to investments that may not yield the expected returns in a low demand, low price scenario.<sup>21</sup> Carbon Tracker is particularly critical of the oil industry, which they believe is still operating on the basis of very aggressive assumptions, including the OPEC assumption which is predicting a 40% growth in fossil fuels out to 2040.<sup>22</sup> However, in the context of the transition to sustainable energy, about 60% of publicly held debt in oil and gas companies, representing \$636bn, matures after 2020 and is at risk of repricing as investment in clean energy grows and investment in fossil fuels decreases.<sup>23</sup>

Divestment from fossil fuels does not fully address the need to transition to a sustainable economy, and therefore the debate has continued to deepen on the subject, in part driven by the almost 200 countries which agreed at COP21 in December 2015 to reduce greenhouse gas emissions and accelerate the transition to a low-carbon economy.

As the financial risk implications of climate change are often misunderstood and the long-term nature of the problem makes it challenging in the context of economic decision-making, the G20 finance ministers and central bank governors asked the Financial Stability Board to review how the financial sector takes account of climate-related issues. The resulting industry-led Task Force on Climate-related Financial Disclosures has made recommendations to banks, insurance companies, asset managers, and asset owners to help influence organisations to provide more consistent climate-related financial disclosure. The key recommendation is that companies should stress test their potential climate-related risks and opportunities under different scenarios, including a 2°C scenario to understand the full impact across their portfolio.<sup>24</sup>

### Richard Burrett

Richard Burrett is a partner at Earth Capital Partners – a company specialising in providing advice on investments that address the challenges of sustainable development. He has spent over 30 years involved in international finance. In his 20 years with ABN AMRO, he developed extensive experience of project and structured finance, particularly in the energy and infrastructure sectors. In the role of global head of project finance, he was also instrumental in the creation of the Equator Principles, a market-recognised standard for managing environmental and social risk issues in project financing. Latterly, as global head of sustainability, he chaired the group's Sustainability Council and developed the bank's strategy on climate change and the carbon markets. Richard is a Fellow of the University of Cambridge Institute for Sustainability Leadership and senior adviser to the Earth Security Group. He holds a BA in Modern Languages and an MBA, both from Durham University.

Overall, there is a lack of systematic integration of ESG issues into capital adequacy assessment in the financial regulation of both the banking and insurance sectors.<sup>25</sup> Long-term systemic risks such as climate change are not integrated into Basel Committee on Banking Supervision frameworks.<sup>26</sup> However, some central banks have been involved at the country level in terms of promoting integration of ESG. In 2012, the Central Bank of Nigeria launched the Nigerian Sustainable Banking Principles, which are compulsory and require that banks develop a management approach that balances environmental and social risks through their business activities. In 2016, the People's Bank of China and the G20 Green Finance Study Group released the Guidelines for Establishing the Green Financial System which states that its main purpose is "to mobilise and incentivise more private capital" to invest in green industries.<sup>27</sup> The fragmented approach to ESG integration from all actors including governments, regulators, stock exchanges, investors, companies, and NGOs is a significant risk to the SDG funding gap.

## Can the momentum be sustained?

While awareness is growing of the role investors and other financial institutions can play in financing the transition to a low-carbon and sustainable economy, the policy and regulatory environment to facilitate this at the scale and pace required is lacking. The financing needs of the Sustainable Development Goals will run into trillions rather than billions.<sup>28</sup> Policymakers should have a duty to the wellbeing of both current and future generations, as well as to the natural capital upon which we all depend. The current reliance on largely voluntary initiatives from the private sector to address these sustainability challenges will not promote the transformational change required. Policy action is required to scale up the flow of capital towards sustainable businesses of the future and away from the unsustainable practices of 'business as usual'. This will include putting pressure on policymakers to address the key sustainability challenges within capital markets and the broader

economy. Government inaction in this area will increasingly reduce the wellbeing of current and future generations. At its heart, this means changing the cost of capital.

### The role of overarching incentives

A World Bank study from late 2016 charts how carbon markets have developed around the globe,<sup>29</sup> but, as stated above, the volume and price of carbon trading remains low as does the degree of linkage between these fledgling markets. As such, no meaningful price signal is being sent to the markets or factored into decision-making. Sir Nicholas Stern described this as the greatest market failure the world has seen.<sup>30</sup>

In terms of broader ecosystem benefits, the situation is arguably less favourably developed. A 2014 study on ScienceDirect by De Groot et al produced global estimates of the value of ecosystems and their services. Acknowledging the uncertainties and contextual nature of any valuation, the analysis shows that the total value of ecosystem services to the global economy is considerable but, perhaps more importantly, their results show that most of this value is outside the market and "best considered as non-tradeable public benefits".<sup>31</sup> The continued over-exploitation of ecosystems thus comes, they argue, at the expense of future generations and this information is not being used to improve decision-making and institutions for biodiversity conservation and sustainable ecosystem management.

One attempt to address this has been the Wealth Accounting and Valuation of Ecosystem Services (WAVES) global partnership program launched by the World Bank.<sup>32</sup> WAVES is a partnership that aims to promote sustainable development by ensuring that natural resources are mainstreamed in development planning and national economic accounts. Another manifestation of this approach is the creation of the Natural Capital Committee in the UK, which advises the government on natural capital, such as forests, rivers, minerals and oceans, and looks at the benefits we derive from natural assets, such as food, recreation, clean water, hazard protection and clean air. It is questionable, however, what impact this advisory group has had on UK policy development in this space and what signals, if any, this has sent to the wider market.

Despite the lack of these external market pricing signals, responsible investment initiatives such as Principles for Responsible Investment (PRI) with their large global memberships claim to promote the analysis and integration of emerging ESG issues into both risk management and product development. The degree to which these factors are being systematically integrated is however an area of debate and arguably many ESG impacts remain as externalities in decision-making terms. In 2012, a study by Mercer<sup>33</sup> (a leading global investment consultant) of 5,000 different fund management strategies found low levels of ESG integration. Mercer's work in this area led to a report in 2014 setting out their own thinking on *An investment framework for sustainable growth*.<sup>34</sup>

Despite a plethora of studies showing clear links between ESG integration and positive corporate financial performance, there is still an urban myth that ESG integration will lead to underperformance. The global sustainability movement has made significant progress in the past decade, evidenced in part by the increasing number of companies and governments actively pursuing sustainability strategies. Despite this, the massive financial investments necessary to achieve environmentally and socially sustainable business models appear somewhat hindered by lingering misperceptions regarding financial returns. These persist in

the investment sector where it is often argued that the business case for sustainable investment strategies has yet to be conclusively made and there is a trade-off between being socially and environmentally sustainable and achieving superior financial returns.

Morgan Stanley research<sup>35</sup> argues that in the world of finance nothing helps dispel a myth quite like a solid business case. "There is a realisation that resource scarcity and the incorrect pricing of resources such as water, clean air and soil will ultimately impact business," says Mindy Lubber, president of Ceres, a non-profit organisation that works with companies and investors to incorporate sustainability into business planning and decision-making. "The connection between environmental, social and governance factors and corporate financial performance is becoming increasingly clear." This implies significant value at risk.

An increasing body of academic research is arguing this case. Khan and Serafeim and a team at Harvard Business School, using quantitative research methods, support that view. In a 2015 HBS paper<sup>36</sup> the team looked at the investment performance over time of firms with high and low focus on material sustainability issues and revealed a significant outperformance by those companies with a high focus on material sustainability issues.

A key finding emerging from the research is that understanding the materiality of the different sustainability issues for different companies (and their respective sectors) seems to be an important factor for understanding the financial impact of these issues. This may appear obvious but some corporate sustainability strategies are wide-ranging and externally focused and less focused on the issues that are really material to the company.

According to Serafeim, this means that companies can create economic value or just waste shareholders' money by trying to "do good". Which one of the two happens depends on whether the company is trying to improve performance on an underlying topic that is important for the industry that it is in, Serafeim argues. Identifying what is material for a company, and how to improve performance on that issue in a way that is synergistic to financial performance, requires demanding work from the part of the company. There is a clear pointer here for the management to ensure real internal understanding of the sustainability issues relevant and material to the business and that these are proactively managed, and performance disclosed in the company's reporting. This will be critical for those corporates undertaking sustainability or integrated reporting and engaging and communicating to end investors.

The theme of identifying sustainability issues that are both relevant and material to company performance and hence investment return is gaining traction. Similarly, approaches that look at the relevant performance of different investment strategies with alternative weightings to reflect issues such as climate change and carbon intensity are increasingly under review. Given the recent increase in the growth of 'passive' investment mandates, PRI members are currently looking at how enhanced passive and sustainable smart beta approaches to investment analysis can generate superior returns in this growing sector. If the use of smart sustainability focused indices gains traction, then companies that lead their sector in terms of sustainability performance may retain positions in these indices and maintain investment levels.

A German meta study in 2015 entitled *ESG and financial performance: aggregated evidence from more than 2,000 empirical studies*, (Gunnar Friede, Timo Busch & Alexander Bassen)<sup>37</sup> looks at the link between ESG integration and corporate financial performance (CFP). The fact that this

17. <https://www.cdp.net/en/info/about-us>.

18. <https://www.theguardian.com/sustainable-business/blog/carbon-disclosure-project-cdp-frances-way>.

19. <https://www.globalreporting.org/information/about-gri/Pages/default.aspx>.

20. <http://integratedreporting.org/why-the-need-for-change/>.

21. [http://unepinquiry.org/wp-content/uploads/2016/09/The\\_Financial\\_System\\_We\\_Need\\_From\\_Momentum\\_to\\_Transformation\\_Summary\\_EN.pdf](http://unepinquiry.org/wp-content/uploads/2016/09/The_Financial_System_We_Need_From_Momentum_to_Transformation_Summary_EN.pdf).

22. [http://www.opec.org/opec\\_web/static\\_files\\_project/media/downloads/publications/WOO%202016.pdf](http://www.opec.org/opec_web/static_files_project/media/downloads/publications/WOO%202016.pdf).

23. <https://www.bloomberg.com/news/articles/2017-01-23/oil-bonds-may-face-sharp-repricing-on-climate-boe-analysts-blog>.

24. [https://www.fsb-tcfd.org/wp-content/uploads/2016/12/16\\_1221\\_TCFD\\_Report\\_Letter.pdf](https://www.fsb-tcfd.org/wp-content/uploads/2016/12/16_1221_TCFD_Report_Letter.pdf).

25. [http://www.iisd.org/pdf/2012/lenses\\_clocks\\_june\\_2012.pdf](http://www.iisd.org/pdf/2012/lenses_clocks_june_2012.pdf).

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study takes aggregated evidence from more than 2,000 empirical studies over 30 years makes it the most comprehensive data set analysed. While roughly 10% of studies find a negative ESG-CFP relationship, 48% of studies report a positive effect on CFP (the remainder are mixed or neutral results). Furthermore, the positive ESG impact on CFP appears stable over time. “Promising results” are obtained when differentiating for portfolio and non-portfolio studies, regions, and young asset classes for ESG investing such as emerging markets, corporate bonds, and green real estate. This study concludes that the business case for ESG investing is empirically very well founded. It may however not be the final word on this subject.

Fiduciary duty remains a potential reason for some to push ESG to the fringes as immaterial. Short-term focus on financial return is often cited as the key reason for this and several legal and structural issues that promote this financial focus and short-termism are under scrutiny. Many investors are still not systematically considering ESG integration as part of their fiduciary duty, claiming that financial return is their dominant fiduciary focus. Increasingly, it is being argued that investors should consider ESG integration as part of their fiduciary duty rather than ignore it. UNEP FI has partnered with the PRI, the UN Global Compact, and the UNEP Inquiry to review investors’ practices and policies. The project will identify investors’ needs and concerns to be addressed to achieve ESG integration at a global level and will reveal how policies and legal frameworks can accelerate the process.

## Disclosure of ESG impacts and dependencies

Stakeholders are calling for enhanced reporting of corporate responsibility and other information that impacts business performance. This is predicated on the thesis that today an organisation creates value not only for its shareholders but also for the society as a whole by means of a sustainable strategy. Disclosure of the material ESG impacts and dependencies becomes critical to understand the fundamental sustainability of a business and is at the heart of the integrated reporting.

In advance of the Earth Summit in Rio in 2012 (Rio+20), a coalition of investors, the Corporate Sustainability Reporting Coalition (CSRC),<sup>38</sup> convened by Aviva and representing \$2tn of assets, asked participants at Rio+20 to commit to an agreement on sustainability reporting to enable investors to help guide the world towards a sustainable future. They argued that this agreement needed two core elements for such a convention to work.

First, the convention would be a commitment by UN member states to develop regulations, codes or listing rules that encourage the integration of sustainability issues within the annual reports of all listed and large private companies. Second, they offered an opt-out for companies that elect not to report on sustainability issues. In that case those companies would be required to explain their reasons to their stakeholders. In other words, corporate sustainability disclosure would be on a ‘report or explain’ basis. Despite this pressure from mainstream financial institutions, governments participating at Rio were collectively reluctant to make integrated reporting mandatory. Disclosure was discussed but left as a voluntary recommendation in the summit output document.

In December 2014, the European Commission adopted a new directive obliging large corporations to provide non-financial disclosure to the markets. Companies falling into that classification would be required to report on environmental, social and employee-related, human rights, anti-corruption and bribery matters. Additionally, these large corporations would be required to describe their business model, outcomes, and risks of the policies on the above topics. The reporting techniques are encouraged to rely on recognised frameworks such as GRI’s Sustainability Reporting

Guidelines and will also include recommendations from the Task Force on Climate-related Financial Disclosure. At the time of writing, this ‘obligation’ remains a work in progress. It remains a case of ‘should’ rather than ‘must’.

Despite the seemingly growing pressure, resistance to such sustainability reporting remains. There is a perception of higher costs and resource requirements at every level of the corporation to enable this to be done, primarily due to lack of experience in the assessment and understanding of this issue set and an increase in the proliferation of reporting requests from different bodies. It can be argued the lack of overall progress towards formal mandatory disclosure has led to that proliferation of voluntary initiatives such as the Carbon Disclosure Project, and Dow Jones Sustainability Initiative imposing a range of different requirements and using differing standards of reporting.

Some also fear that in more litigious environments, greater transparency can lead to potential new risks for the company due to the disclosure of negative performance and the corresponding responsibility to redress it. Understanding an organisation’s key impacts and dependencies becomes a potential liability rather than a matter of responsibility. The historic denial by certain fossil fuel-based companies of climate change impacts is perhaps founded in that concern.

The lack of appropriate information flowing between the market and financiers causes issues of both market inefficiency and ineffectiveness. Both potentially lead to the misallocation of capital. Due to governmental failure to require proper internalisation and disclosure of environmental and social costs into companies’ profit and loss statements, the capital markets do not systematically incorporate these full social and environmental costs into valuation models. Indeed, until these market failures are corrected through government intervention of some kind, some have argued that it would be irrational for investors to incorporate such costs<sup>39</sup> as they do not affect financial figures and appear on the balance sheet or – therefore – affect companies’ profitability. At its most basic level, this means that corporate cost of capital does not reflect the true sustainability of the firm. This market failure leads inter alia to issues such as the carbon bubble and resultant investment in future stranded assets. Ultimately, this leads to growing concerns on financial stability.

## The need for transformation

A comprehensive transformation of the entire financial system is arguably required to deliver a sustainable low-carbon economy. However, it will be difficult to keep the momentum from 2016 going without both the public sector and private market leadership to fully embed sustainability into each step of the process – from regulatory policy level through to integration of sustainability criteria into mainstream private sector financial decision-making.

Recommendations in 2016 from UNEP’s Inquiry into the Design of a Sustainable Financial System highlight that a shift in the system is required, including developing common methods, tools and standards, embedding sustainability at the national level into long-term road maps for financial reform, leveraging public finance, and raising capacity building.<sup>40</sup> Each part of the financial system has its part to play to ensure the transition to a sustainable economy including the public sector, pension fund management, issuers and regulators.

The public sector, including central banks, finance ministers and public financial institutions, is taking a leadership role and is involved in the debate including the Financial Stability Board’s Task Force on Climate Financial Disclosures and the G20’s Green Finance Study Group. While harnessing private capital is essential to make up the lack of funding from public finance, the creation of new markets such as green bonds

has been critical to the mainstream development of sustainable finance. The public market has also pioneered incentives and subsidies that support sustainable development, including tax relief on debt, savings, and pensions, as governments use incentives and innovation to align with sustainability goals.

Asset owners have a responsibility to publish commitments to ESG integration and report to beneficiaries how these commitments have been implemented. Furthermore, there is a need to build capacity with trustees, boards and executives so that they have the knowledge to hold asset managers and consultants to account for their performance in terms of long-term value creation of the assets under management. Asset owners should also not solely rely on their asset managers to engage with companies on providing ESG transparency. This will almost certainly necessitate a review of the remuneration and incentive mechanisms built into asset management contracts to ensure that they are managed for the long term.

Issuers will also be aware of current market momentum as governments and public finance institutions emphasise the importance of ESG disclosure as part of the larger post-2015 sustainable development framework. This will increase a company’s need to evaluate (or re-evaluate) their sustainability strategy and to consider how to improve their ESG communication to the market. As it stands, the market is lacking an effective system by which to price sustainability into financial asset values and therefore reward companies by directing flows toward sustainable assets. Effective disclosure of relevant ESG information is necessary to ensure greater allocation of capital to sustainable outcomes by rewarding sustainable companies and encouraging a shift in behaviour by less sustainable companies.<sup>41</sup> Research indicates that companies that successfully integrate ESG considerations in their business strategy gain significant economic, accounting, reputational and market advantages<sup>42</sup> and firms that voluntarily disclose information to the market including sustainability data, have a lower cost of capital than firms that do not.<sup>43</sup>

Global regulators such as the International Organization of Securities Commissions (IOSCO) have not historically placed ESG disclosure on their agenda nor have they adequately responded to collective investor calls to action requesting that they work more closely with regulators, stock exchanges and other related parties to improve the disclosure of material and high quality ESG information in the global marketplace. Change is starting to filter through at regulators, including the US Securities and Exchange Commission (SEC), which in April 2016 published its consultation on *Business and financial disclosure required by Regulation S-K*. Nonetheless, the chair of the SEC, Mary Jo White, has continued to urge investors that want to change corporate behaviour on sustainability-related issues to use their stewardship.<sup>44</sup> Until regulators globally push for mandatory ESG disclosure in listing requirement and information memoranda, stock exchanges will continue to create their own voluntary guidance which is a step forward but still lacking in terms of a system shift.

## Supporting global sustainable finance initiatives

We should not underestimate the role that public finance institutions play in mobilising private capital and stimulating market leadership for sustainable development. Multilateral and development finance institutions have played a significant role in recent years in promoting co-financing with private sector institutions to address sustainable development challenges. At the same time, the development of many

sustainability standards and approaches in private sector financial institutions can be traced back to or were supported by public sector entities. The UNEP Finance Initiative is one such example of this. The Principles for Responsible Investment received UN patronage. UNEP FI facilitated the development of the Principles for Sustainable Insurance and the IFC (International Finance Corporation) had a pivotal role in the creation of the Equator Principles.

As previously highlighted, there needs to be a massive scaling of finance around achievement of the SDGs. About \$5–\$7tn a year until 2030 is needed to realise the SDGs worldwide, including investments into infrastructure, clean energy, water and sanitation, and agriculture. Public-private sector partnerships (PPPs) and ‘blended finance’ will be one core element of that response and the work currently being done by private sector banks and investors around ‘positive impact finance’ is an acknowledgment that the greater part of the necessary financing and investment will come from private finance.

The institutions involved argue that “while a wide range of sustainable finance products and services are available in the market, these mobilise limited funds compared to what is needed and for a limited number of things – based on a pre-identification of acceptable sectors and activities.”

They quote often unattractive risk and return profiles as barriers to greater investment and consequently the amount of private finance mobilised to date to achieve the SDGs is in marked contrast to the scale of the needs.<sup>45</sup>

To bridge that funding gap for sustainable development and the attainment of the SDGs requires a new, impact-based approach, based on a holistic consideration and integration of the three pillars of sustainable development into all decision-making. The manifesto around which the leaders of this initiative align calls for “a collaborative, solution-building approach to developing and implementing new business models and financing approaches that will help address the SDG funding gap and realise the SDGs themselves”.

Financing the ‘future we want’ (the mantra of Rio+20) makes sense from both a risk management and resilience perspective. It aligns the social purpose of finance to agreed development objectives such as the SDGs. Some financial institutions are beginning to think through what such an approach might look like at a national level. Lloyds Banking Group’s Helping Britain Prosper Plan<sup>46</sup> is one such example in the UK. In South Africa, Nedbank’s Fairshare 2030 plan describes itself as “a carefully calculated flow of money, allocated each year to invest in future-proofing the environment, society and our business”.<sup>47</sup>

These are just two examples of the way financial intermediaries can apply their influence and creativity to increasing the flow of capital into business models that serve society’s long-term interests. To channel technological innovation to finance sustainable development. To finance the future and not the past.

## Conclusion

In this paper, we have set out to look at some of the critical issues around financing the sustainable energy transition. We have deliberately looked at the issues of the broader green finance sector as many of the factors that will ultimately lead capital flows towards positive sustainability impact and away from the financing of unsustainable social and economic

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activity are common to both low-carbon and green finance approaches. At a development level, it can be argued that the sustainable energy transition is a core element to several of the global sustainable development goals (SDGs). Numbers 7 (Affordable and clean energy) and 13 (Climate action) have direct impact on that energy agenda but it is equally difficult to see how others, including 3 (Good health and wellbeing); 9 (Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation); and 12 (Ensure sustainable consumption and production patterns), can be achieved without a focus on sustainable energy transformation. How indeed can goals 14 (Life below water) or 15 (Life on land) be achieved without a move from the fossil fuel driven pollution of our current energy mix?

Much progress has been made in recent years despite the setback of the Copenhagen COP and the failure then to reach a global agreement to set clear policy signals towards a low-carbon energy transition. The success of Paris 2015 COP and the launch of the SDGs have further encouraged market momentum in the development of green finance. The growth in green financing instruments and issuance has increased the flow of capital towards that transition. At the same time, the development

and largely voluntary adoption of global integrated frameworks are providing the criteria for ESG integration into mainstream finance decision-making and encouraging capital flows away from negative sustainability outcomes. As a reality check, however, the environment is not yet conducive to raise the momentum to deliver the scale of capital required to fully finance that transition. Overarching incentives, such as carbon pricing, are growing but the market development is failing to send the strength of pricing signal to trigger the scale of change required. Negative externalities are still poorly recognised and understood. Disclosure by companies of their material ESG impacts and dependencies are being socialised through initiatives such as the CDP, GRI and integrated reporting. The uptake, however, is not uniform and widespread. To achieve the level of ambition required will demand a holistic transformation of the entire system. This necessitates sustainability criteria becoming mainstream in both public and private finance sectors led by clear policy signals and regulation. Only then will capital flow to support sustainable energy finance sectors worldwide. Only then will the sector be geared to finance the sustainable low energy society of the future.

#### MARKET CRISES: SHOULD WE DISCUSS THEM MORE – INCLUDING WITH OUR CLIENTS?

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and intermediaries) do not spend more time discussing the potential for future financial crises. These discussions might extend both amongst financial professionals themselves and to conversations with their clients. Although anticipating the precise timing of crises can be difficult, who else should clients look to for guidance but their financial advisers and portfolio managers?

In this context, it may be worth clarifying that 'clients' could mean not only the retail clients of financial intermediaries but also clients of investment portfolio managers within the financial services sector.

This paper reviews ideas around the fundamental causes of financial crises, which are often rooted in human nature. It also looks at characteristics identifying the top of a 'bull' market, the most financially dangerous period to invest, being the 'eve' of a 'bear' market, or other downward correction. It then asks what investors can do to remain rational and not get caught out by investing at a market top. The next question is what financial professionals should be doing given the known regularity of financial crises, including from a client perspective, and why they may find it difficult. Finally, some thoughts are offered on portfolio stress-testing as a response and how this could open the door to a better quality of conversation with clients.

## The fundamental nature of financial crises

For investors, bear markets and corrections are a source of great concern since a stock market crash can result in a cumulative decline of 25% or more in real equity values.<sup>2</sup> Markets often appear to be driven as much by sentiment as by economic reality and, as famously suggested by Federal Reserve Board chairman Alan Greenspan during the dot-com bubble of the 1990s, can suffer from 'irrational exuberance'.<sup>3</sup>

Stock market values are perceived to be linked to economic market cycles, but since market participants seek to anticipate investment opportunities ahead of competitors, markets are forward-looking. Investors must, therefore, make judgements and forecasts about economic and investment outcomes in the face of incomplete information. This results in the possibility of error and decisions coloured by human psychological and behavioural biases. With many market participants a wide range of views is also generated. Logically, not all of these can be correct.

Even if 'normal' economic cycles could be predicted from interest rates, unemployment and other data, national economies are subject to external influences from foreign countries via trade, decisions made by their governments and wider geopolitical events. Some countries may be 'serial defaulters' on their sovereign debt. These countries tend to over-borrow during good times, leaving them vulnerable during the inevitable downturns.<sup>4,5</sup> Governments can be prone to treat favourable shocks as permanent developments, fuelling a spending spree and borrowing that eventually ends in tears.<sup>4</sup> Alternatively, financial innovations can appear to render illiquid assets more liquid, permitting them to command higher values than previously, such as during the US sub-prime mortgage crisis of 2007.<sup>4</sup>

### Secular trends

Secular trends can significantly change the investment landscape, creating new opportunities while undermining others. Market practitioners have a range of opinions, so while some may correctly anticipate trends, others will not. Further, the results of elections or national referendums may turn slight popular biases into clear-cut outcomes which can come as a surprise to the consensus view. Examples of secular trends include:

- Growth in nationalism, including the UK's 2016 Brexit vote, and the election of more nationalistic political candidates, with potential for protectionist trade policies as a contrast to a previous era of increasing free trade.
- New technologies, including, more recently, the internet dot-com stocks bubble (the 1990s).<sup>3</sup> However, this is hardly a uniquely recent phenomenon considering, for example, the 1840s railroad mania and 1793 canal mania of earlier eras.<sup>6</sup>
- Demographic impacts as populations age, creating increased demand for healthcare and associated support services, combined with disinvestment associated with drawdown from pensions.

### Human nature

Human nature often seems to lead to the over-anticipation of future developments (both good and bad) and exaggerated valuations. The fickle nature of human confidence plays an important role.<sup>4</sup> People prefer simple explanations, and prefer any explanation to none; that does not mean such explanations are correct.<sup>5</sup> Leaders in the financial sector may believe that their innovations have genuinely added value and underappreciate the risks their firms are taking.<sup>4</sup> Alternatively, financial product providers may be responding to inappropriate incentives in less well-regulated areas.<sup>5</sup> Almost all bubbles require some form of new financial technology or financial engineering.<sup>5</sup>

### Governments

One economic role governments play is to maintain a balance between producers and consumers to assure fair market prices. However, other forces are at work in politics, with constituencies attempting to influence governments through money, polling or petitioning (the 'will of the people'). Governments respond to political influences both to silence critics and to stay in power. Market events can also provoke responses from financial authorities, which, although intended to address current difficulties, may sow the seeds of future problems, such as quantitative easing.<sup>5</sup> The outcomes that result can lead to financial bubbles, caused by creating artificial criteria to achieve political goals. Government can exert its power over financial markets and on public thinking in ways which can set things up for a future disaster.<sup>7</sup>

It is possible that the complexities of financial markets make them prone to fingers of instability which extend throughout the system, so they can amplify small events with potentially catastrophic consequences. Hyman

Minsky also pointed out that stability leads to instability. For example, long periods of stability can lead to debt accumulation until dangerous levels of leverage are reached.<sup>5</sup>

## Some characteristics of the top of a bull market

At the top of a bull market (the 'eve' of a bear market), when a fall in market values is more likely, media commentary may justify stretched valuations by saying there has been a change in economic circumstances so that "this time it is different",<sup>8,9</sup> although almost certainly it is not.<sup>4</sup> Indeed, in the run-up to the 2007 sub-prime crisis, the International Monetary Fund concludes in its April 2007 World Economic Outlook that risks to the global economy have become extremely low.<sup>4</sup>

A simple outline of a financial mania is given by Slater:<sup>8</sup>

- An image of instant wealth attracts and forms the financial, psychological 'crowd'.
- People see what they want to see, a mixture of facts and fancy which builds an image in their minds. A few examples of exceptional gains in the new area of interest are promoted as representative of the profits that can be made by all.
- Acknowledged experts in the field urge the crowd on its way.
- The financial crowd becomes irrational and blind to danger, ignoring fundamentals and traditional measures of value, while prices continue to rise in a self-feeding process that encourages more buyers to participate.
- Suddenly the image that has attracted and formed the financial crowd changes.
- Fear replaces greed as the bubble bursts with disastrous financial consequences for those who invested near the top.

Although only a stylised outline of a market crisis, awareness of this pattern may be of some help for avoiding developing market crises.

## Additional guidance for rationality

What other guidance can be used to help ensure that investors do not get caught up in irrational behaviour?

In 1949 Benjamin Graham introduced an imaginary business partner called 'Mr Market' who makes daily offers to buy your share of a business that you had previously purchased for (say) \$1,000, or else to offer you additional equity at the price he offers. Mr Market's offers depend upon his moods; sometimes they appear reasonable, but on other occasions he lets enthusiasm or fears run away with him and makes offers that seem foolishly high or low.<sup>10</sup> The message is that you should have your own idea of what your share in the business is worth and not let Mr Market's daily communications determine your assessment of the value of your holding.

Clearly, investment managers should develop and use their own asset valuation metrics to help guide them away from emotional responses. Of course, investment managers' valuation models are often based on their own theories, giving scope for a range of opinion, or even, more dangerously, on momentum in stock valuation.

In addition to flawed forecasts, external influences, secular trends, political activities and misinterpretation of underlying economic factors, investors are vulnerable to human psychological characteristics identified by behavioural finance theory. These can include herding behaviours (following the crowd) as well as tendencies for investors that result in irrational behaviours including loss aversion, framing relative

to some reference point, mental accounting, overconfidence, inertia, representativeness and basing decisions on information availability which may be incomplete. Overconfidence touches the irrational belief that financial crises happen to other people at other times; not us, here and now.<sup>4</sup> Behavioural finance theory has become a large topic – an overview can be found in.<sup>11</sup>

Actually, the appreciation of the importance of crowd psychology is long established, with a discussion of how a crowd can assume a personality of its own explored in Gustave Le Bon's classic work *The crowd* originally published in 1895.<sup>12</sup> Many historical manias are also outlined in Charles MacKay's *Extraordinary Popular Delusions*<sup>13</sup> which details a sobering list of human follies.

## Financial professionals and market crises

The role of financial professionals' client relationships is worth consideration in the context of market crises. Clearly, clients would not wish to invest their hard-earned savings on the eve of a financial crisis. It is also natural that they would expect to be able to turn to financial professionals for guidance on when it is safe to invest and when it might be wiser to wait.

Financial professionals may be able to help identify periods when markets, asset classes and assets may be overvalued or undervalued, particularly in extreme cases. Of course, that is not to say that identification of overvalued markets is easy. With many opinions and different valuation models available at any point of time, there will be a wide range of opinion as to how advanced the level of the market is – however this should not absolve the financial professional from their obligation to try to do so.

Yet it appears to be a rare event that a fund manager, fund provider or sales team would admit that 'right now' might not be the best time to invest in their asset class and that it might be better to wait for a period. Usually, some argument can be found to justify an otherwise apparently high valuation for an asset. If the valuation method used differs from that used in the past, the argument might be used that "this time is different".<sup>4</sup>

One message appears to be that it is unwise to revise valuation methodologies simply to accommodate ever-rising market prices. The problem is that markets appear capable of price rises well beyond what might be expected from rational pricing models for extended periods. An investor relying purely on pricing models would likely find themselves missing out on periods of meaningful returns, creating difficulties for an adviser in determining whether to invest or not.

Long, strong positive trends in an asset price tend to generate a positive response from investors wishing to allocate funds to it. Of course, the price rise could be an overdue correction for a previously unloved asset class, or it could herald the development of genuine new investment opportunities. On the other hand, it may be an irrational response of the type documented by behavioural finance theory. The concern is that a fund management house could see this as an opportunity, perhaps launching new funds at or near the top of a strong positive asset class trend. One could argue that this would increase the probability that prospects for that asset class might be poor. However, given human nature, it also makes for an easier sell in the fund business.

The danger is that asset prices are often cyclical, so after a long period of strong growth, the potential for further meaningful upside may be reduced, while the likelihood of losses on the asset class may be growing. If a fund management house were to launch a fund in an asset class after a period of strong growth in that sector, would that be a case of self-interest? Although the intention may be genuine (perhaps making a new product type available to investors), financial practitioners that launch funds under such circumstances should perhaps be aware that they

could stand accused of exploiting investors' behavioural weaknesses by encouraging investment after a period of strong growth in an asset class. If a fund launch transpires to have occurred at, or near the top of, the cycle for that asset class, one could ask whether the fund manager knew this and was acting in self-interest, or the fund manager did not appreciate the asset class was at the peak of its investment cycle. Either way the fund manager does not come out looking good: they were either self-serving or else not as knowledgeable about the asset class as they claimed.

Alternatively, a fund manager could wait until they are confident of further future upside potential. However, from a sales perspective, a fund management house might prefer investment immediately (even if this could place the client's wealth at additional risk), since judgements regarding the timing and extent of an asset's valuation cycle and prospects are not certain, and if the investment is delayed a client might change their mind.

A thought-chain for potential behavioural implications of client investments under fluctuating market conditions might be expressed in a question-and-answer format as follows.

Question	Answer
Are clients more inclined to invest after a long strong trend than when an asset is weak?	Yes (behavioural psychology, herding)
Should they be?	No (probably not as many asset classes can be cyclical in their returns)
Is a downturn or correction more likely after a long strong positive trend than before it?	Yes (probably, again due to the cyclical nature of returns on many asset classes)
Should financial professionals help try and protect their clients from their behavioural weaknesses?	Yes
Would that be an easy sell to clients?	Probably not, although if made aware, many clients might appreciate the additional effort on their behalf
Would clients appreciate it?	In the short term probably not, in the long term, quite possibly yes.
Does it increase the chance of a financial professional being seen to have mistimed the market?	Yes (the problem is that if an adviser recommends waiting and the market goes up they will look bad, and vice-versa)
Does it make a financial professional's job harder?	Yes, absolutely (the potential to look bad to a client is amplified)
But should financial professionals at least try?	Yes (but they need a strong framework to help support this)

The difficulty is that by advising clients to wait or invest, based on professional judgement of the state of the market, an adviser runs a clear risk of being seen to be wrong in their market timing decision. A view expressed as 'market timing is impossible, we cannot know' consistently applied makes for an easier sell to a client, although it transfers market timing risk from the (presumably more knowledgeable) financial professional to their (presumably less knowledgeable) client. In essence this seems to be something of an abdication of responsibility, but given the difficulties in reliably timing the market, what is an adviser to do? In the section below one possible response is offered.

## Stress testing: a response to the risk of market crises

Given the difficulties in timing markets and challenges around dealing with clients, in this context a framework that offers a consistent approach is required. Ideally, this framework should facilitate discussion with the client around potential market risks (including market crisis events) and generally promote a better quality of dialogue. One potential solution might be to use tools like portfolio stress-testing to help identify and quantify non-standard investment risks.

Market practitioners know that assessing portfolio risks is difficult, and conventional risk measures such as volatility and value-at-risk may assume normally distributed returns, which may underestimate the true portfolio risks. Measures such as beta depend upon volatility and so are subject to the same difficulties. For clients, such measures are arcane, and while useful for financial practitioners, are unlikely to be helpful in relation to discussions with clients. Market crises tend not to fit into a convenient theoretical framework and are extremely unlikely to be captured by conventional assumptions of normal or log-normal returns distributions. Even other measures of risk, such as drawdown, are likely to depend on using data derived from some historical period, which may be insufficient to capture information from previous market crises. Forthcoming market crises are unlikely to replicate historical crises, and even if there are some similarities, usually some new aspect will be present.

To address concerns about a potential future market crisis, a portfolio manager or other financial practitioner may wish to consider stress-testing a portfolio against significant historical market events, or against invented scenarios that reflect their (or their clients) particular concerns.<sup>14</sup>

Portfolio stress-testing helps identify and quantify risks within a portfolio, to indicate how it might respond to specific market outcomes or other concerns. Stress-testing can include looking at the potential downside risk of portfolios, or methods that help estimate what response might be expected under difficult (crisis) conditions. Although not guaranteed to identify actual impacts of future events on a portfolio, it is a helpful tool in an investment portfolio manager's armoury. Stress tests should be designed to determine how a portfolio might respond to adverse developments so that weak points can be identified early and preventative action is taken. Typically the focus may be on key risk areas, such as credit or market risk and liquidity.<sup>14</sup>

A strength of this approach is that stressed scenarios can be discussed with clients in fairly straightforward terms ("we are worried in case the dollar collapses against the euro by 20%" or "after the recent long bull market, we think there is a chance that stock markets could correct by 15%. Given your investment time horizon, how do you feel about that?").

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Furthermore, clients can even express their own fears, which may be already captured by existing stressed scenarios, or may be worthy of further investigation.

Once the outcomes of stress tests are known, a portfolio manager can determine what actions may need to be taken, if any. If the test reveals that an identified scenario has little impact, the manager and client may be reassured. On the other hand, if the testing suggests that the portfolio may be adversely impacted to an unacceptable degree, it can be restructured to reposition the portfolio to make it more resilient to the events considered.

Portfolio stress-testing is a large topic in its own right, with a wide range of techniques used. For an introduction and overview see,<sup>14,15,16</sup> while<sup>17</sup> explores a portfolio diversification stress-testing.

## Conclusions

Anticipating market crises is not easy. Financial professionals must overcome their inbuilt human biases, as well as political and economic systems that can leave markets prone to periodic crises. Given difficulties in anticipating such crises, market practitioners should constantly be on the alert for them, particularly during quiescent periods when everything seems to be sound and markets are generating consistent positive returns.

Although difficult, portfolio managers and intermediaries should be attempting to form judgements about the likelihood of near-term market crises and having conversations with their clients about this topic.

One tool available to professionals for exploring and assessing the impact of non-standard risks on investments is portfolio stress-testing. This provides a framework for financial professionals and advisers to discuss what may be seen as 'outlier' risks amongst themselves and with their clients. In this context, the clients of investment managers may include other financial professionals, such as intermediaries, as well as retail clients and other underlying investors.

By discussing potential future market crises with clients, as well as carrying out regular portfolio stress-testing designed to capture specific concerns raised both by themselves and their clients, this will promote a better quality of dialogue. It will stimulate a more open and rounded discussion about the potential for market crises and the damage they could cause to investment portfolio values. This, in turn, can lead to portfolio restructuring to address key concerns. As a result, portfolios would be more robustly positioned and it would also be clear that portfolio managers and financial intermediaries are actively working to protect the value of their clients' assets.

## CONDUCTING QUANTITATIVE ETHNOGRAPHY IN THE FINANCE SECTOR

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Uncertainty is inherent within the finance sector. In a general sense, it arises from incomplete knowledge necessary to predict events, or to undertake any course of action, while being sure about the results. According to Dosi and Egidi (1991), to analyse how finance professionals behave under uncertainty, one needs to understand the gaps in their knowledge, the learning processes they undertake to address those gaps, and their epistemic frames (which describe how people make decisions and justify their actions) used for evaluating their choices (what are the industry standard procedures or organisational cultures for dealing with specific uncertainty situations?). But the incompleteness of knowledge is not merely absence of facts or vital pieces of information, it could also mean lacking the cognitive ability to link these information elements together into a bigger picture. Finance is a knowledge-intensive sector, and professionals need to learn how to frame, investigate, and solve problems that require more than basic facts and skills in order to succeed.

Results from the first phase of this study show that there are at least five different types of uncertainties faced by finance professionals, because of factors such as: environmental changes; structural changes; political decisions; financial crises; and technological advancements. Depending on the uncertainty, different learning strategies are used by professionals to help them navigate through uncertain times. Thus, it can be posited that professionals operate from different epistemic frames depending on the uncertainty they face. There were two prominent strategies that emerged from in-depth qualitative interviews with finance professionals: networking/help-seeking behaviour and reflection/drawing from their experiences.

Adopting Schon's (1993) theoretical perspective on how professionals solve complex problems, in this research we will focus on how to support this learning in immersive virtual learning environments. Practitioners who work in complex domains cannot solve problems by referring to pre-existing procedures or by directly applying a method used in a previous problem. Instead, solutions are found through an iterative process of trial and observation. These trials are not random guesswork. Schön argues that when professionals encounter novel problems, they try to solve them by running informed experiments performed and evaluated in real time as the problem is addressed. Our earlier research with the CISI illustrates the ways finance professionals solve novel problems by learning on the job, drawing on their professional networks.

## Building epistemic networks

Epistemic Network Analysis (ENA) was developed to model cognitive networks based on the assumption that 'the structure of connections among cognitive elements is more important than mere presence or absence of those elements in isolation' (Shaffer, 2016, p.9). Fig.1 shows

an Epistemic network that depicts the cognitive network of a first-year undergraduate engineering student. The diagram shows the skills (S) and knowledge (K) the student focuses on as she participates within the network. Network models can be used to compare how novice students interact in the network compared with the ways experts collaborate. Network analysis can illuminate the contributions of each individual to the network and how these contribute to the network as a whole.

The first step in building similar cognitive networks within domains of the finance sector requires elements of the epistemic frame of each domain, which can be identified *a priori* from theoretical or empirical analysis or from an ethnographic study of the community in action. Each professional's network will model the structure of connections between knowledge, skills and self-regulated learning and other aspects of finance practice. Direct comparison of network projections is challenging. Comparison can be calculated manually with small numbers of participants. However, this study will be done with the CISI, which has more than 45,000 members, and others. Comparing such large quantities of networks requires summarising the important network features. This is where ENA is useful. It represents each network as a single point in space, where each point is the centroid of the corresponding network.

ENA expedites two main objectives: 1) it processes coded data; 2) it uses the results of this analysis to create visualisations that facilitate exploration and interpretation of data.

## Intervention

To build epistemic models for professionals, we need in-depth information regarding following five SKIVE (skills, knowledge, identity, values, epistemology) elements within the finance sector (or the domain for which we build the simulated learning activity):

- Skills: the things that people within finance do.
- Knowledge: the understandings that people within the profession share.
- Identity: the way that members of the professional community see themselves.
- Values: the beliefs that professionals hold.
- Epistemology: warrants that justify actions or claims as legitimate within the profession.

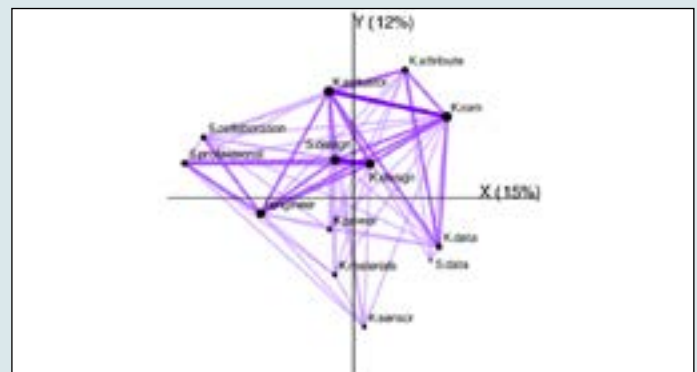


Fig.1: Cognitive network of first year undergraduate student representing the connections the student made while solving a simulated engineering design problem (Shaffer, 2016, p.13)

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