Institute
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A finance system for long term prosperity

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Introduction

Society is in a great transition. The human history of transitions shows they have almost always been driven by advances in technology followed by a deployment across the world changing the way we move, communicate and produce. On each occasion the future was uncertain and ended up being shaped by a small number of individuals - individuals with ideas, passions and loves.

In the distant future humans will look back and see their history between 1900 and 2100 as one of those periods in time. A time that saw a revolution in knowledge and a scaling up of the power we wield over our surroundings and each other.

We are half way through this current great transition. Our leaders have not yet been chosen. Our end point is not set in stone. Who leads and shapes our future? Their ideas, passions and loves will determine who will look back and judge the successes and failures of the transition.

People, technology, engineering, agriculture, the internet, telecommunication, and importantly finance, provide the tools for this transition.

Those born in 1900 saw horses swapped for cars, cars for planes, planes for rockets, electricity reaching into homes, the invention of crayons, sellotape, teabags, colour photography, television, kidney dialysis, pacemakers, mobile phones and computers. We killed almost 80,000 people instantly after dropping the ‘Little Boy’ nuclear bomb on Hiroshima in Japan on 6th August 1945, and put Neil Armstrong and Buzz Aldrin on the moon on 20th July 1969. Neil Armstrong died in 2012 and Theodore Van Kirk, the young navigator of the Enola Gay aircraft that carried the bomb, died in 2014. Buzz Aldrin and survivors of Hiroshima are still alive today.

Over the last century mankind went from being dependent on nature to being the dominant species on the planet while eradicating extreme poverty in developed countries, supporting universal healthcare and feeding almost 8 billion of us. Our power of invention and innovation has demonstrated our ability to think well beyond the confines of our everyday experience.

However, the current generation of young adults in those developed countries are now more likely than ever before to grow up worse off than their parents. If the most pessimistic predictions come true then they could see the severe downturns in global economic development that have in the past led to the collapse of civilisations.

Our society has been optimised to fully exploit the benefits of technology and economic progress. We have developed processes that squeeze every last drop of opportunity out of the system we live in. An optimised society is not very resilient. If you break it in the right place the whole system could come tumbling down.

In this paper I set out a series of five recommendations that could be applied to enable a better response to these challenges and help create a more globally resilient society.

As an Honorary Fellow of the Institute and Faculty of Actuaries (IFoA), I have been proud to engage with the profession and bring an outside voice to its discussion. I feel that radical change is possible and that the profession is set to change course for the better. This is why I use ‘we’ and ‘our’ when referring to actuaries in this paper. A clear call for a ‘revolution’ was made at the workshop that I

hosted for the IFoA by the younger members of the profession. Current responses are not radical enough and it is time to embrace and champion the change that is inevitable.

1. Measuring Progress

Currently our societal progress is built around a singular measure of success – how much production our economy supports in any given year. This measurement leads to a suite of tools and metrics that are used to determine government activity and provides an incentive for business to focus on profit. We must recognise that this measure of success, and the derived tools and metrics, is ideological and political.

The finance sector is at the core of any transition away from today's apparent equilibrium. It is deeply embedded in this ideological and political vision. It is a vision that has delivered wealth and growth over the last century but it is not a vision that is fit for the next century, and the second half of our great transition as a human society.

Is there really a problem that needs to be 'fixed'? I am yet to find anyone who would truly answer that question 'No'. The world has a finite amount of 'stuff' and a lot of that 'stuff' is approaching limitations in availability or at the very least limitations to availability at prices which are affordable.

There are a number of different approaches that can address limitations to growth - keep the limited amount of 'stuff' for ourselves (the wealthy), believe that economic progress brings with it technology fixes, change our economic systems to rebalance towards 'green', maintain wellbeing while reducing physical throughput, or manage our economic decline. There are advocates for each of these solutions and each brings about its' own series of challenges that themselves need 'fixing' or a society that is happy to ignore the consequences.

There are technology fixes already in existence that can solve most of our resource challenges - water desalination for limited water supply, renewable electricity for our energy needs, sustainable intensification to feed the global population at its projected peak, a circular economy with longer lives for technology products. We need people to eat differently, use energy differently and regard the components of our lives that are essential more highly than those that are not. It would also only take a few years (less than a decade) to put all these solutions in place - globally.

However, under our current system this change is unlikely to happen at the pace required.

The problem is governance. It would take a significant fraction of our human capital to put these solutions in place. We would need to train a huge number of engineers, designers, project managers, social scientists and scientists very quickly to be able to deploy the solutions at the scale required. We would need society to agree to change life-styles to fit into this new way of living - and to agree to reframe the way we see societal progress whilst we reset everything.

The problem is also finance. Estimates for the investment needed in our physical assets to achieve a net zero transition by 2050 are in the order of $275 trillion[1] - doing it more quickly would be more expensive. More accurately, the problem is a lack of understanding of the purpose of the finance system[2]. Finance is not neutral. It represents the control system of the economy and unlike anything

[1] https://www.mckinsey.com/business-functions/sustainability/our-insights/the-net-zero-transition-what-it-would-cost-what-it-could-bring

[2] Eisenstein, C., 2011, Sacred Economics: Money, Gift and Society in the Age of Transition: Money, Gift & Society in the Age of Transition, North Atlantic Books, U.S.A.

in the physical world money can be created in an instant with no limits. Therefore, finance should never be a limited factor itself – as Keynes highlighted 'Anything we can do, we can afford'[3].

Has this type of reset happened before? Yes. However, the resetting of societal progress usually takes the form of very bloody wars. The architects of the new infrastructure and economic systems are then rebuilding (literally) from a low base. Can we acknowledge the scale of the challenge without some of our society collapsing first? Do we have to wait for the next major catastrophe and be ready to rebuild with a new blueprint? Even a pause in societal activity as the result of a global pandemic has not created enough of a reset for us to start rebuilding with a new model (although it may well lead to this over time).

Unfortunately since the last major reset of global society - the Second World War - we have lost sight of some of the goals that were agreed. The great economists who thought about how to set up a system to rebuild societies, and then designed it, were philosopher-economists. Political thinking focused on solving particular problems, and drove decisions, so the world would never again have to face a global war. For the last few decades we have lost sight of this. Mainstream economic thinking, without the acknowledgement of underlying ideologies and political thought, is now driving our governments and our political economic philosophy. Misguided economic theory trumps everything else. This was not a conscious plan.

At all levels of government, in most countries, the discourse is still around a dominant economic framing of politics. We seem to have lost ideology, an intelligent ideology that can work with facts. The recent move to try and underpin some of the government decisions by looking at how people actually respond to policy (evidence led policy making) has not addressed this in any meaningful way and more often than not it is actually policy-led evidence making[4] - cherry picking or designing interventions to justify the existence of a favourite policy, government department or business action.

There are political ideologies that can provide solutions to this. Let's take the overly simplified ends of the political extremes. A small government could set a strong vision and society could follow. A large government could control the resources (including people) to deliver the vision. People would only really see a difference in these two extremes depending on the precise implementation and personal convictions of the leaders - and that is where a key problem comes in. Us. We have always found it very difficult to be truly altruistic in our politics. To be truly open.

I am a techno-optimist. I do believe that there is enough water, energy and food available for us all to have a good life. However, a key difference between these challenges today and those in the past is that our footprint is now so great that it is global, and each one of these systems is interconnected. We can no longer "solve water" by throwing energy at it to desalinate seas or oceans. We can no longer find new fossil fuel reserves by pumping unlimited water into the ground. We can no longer get liquid fuel by swapping out our food crops at the scale needed.

Therefore, I am only a techno-optimist if we also actively engage in our direction of travel and our 'purpose'.

It may be the case that we do need a catastrophic failure of our current system to allow a restart. (Un)luckily there are plenty of catastrophic failures that we have now built into the system that are imminent[5]. If we do not actively grapple with our modern dilemmas, we will face these failures and one of them will be large enough to cause a shock that means a restart is the only way forward.

We should note that a society can be very resilient with large inequity (look at places like India) and is very often blind to the actual level of inequity that exists (look at places like the USA). If we are looking for society to last as long as possible then these models do work – at least for the moment. However, they do not maximise our human wellbeing whether at individual or societal levels, and we have recently seen the gaps in resilience emerge (especially in the USA and India).

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[3] http://jwmason.org/slackwire/keynes-quote-of-day-2/

[4] Ellenbeck, S., Lilliestam, J., 2019, How modelers construct energy costs: Discursive elements in Energy System and Integrated Assessment Models, Energy Research & Social Science, 47, 69-77

[5] https://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2022.pdf

Society has also, to date, been very resilient to the state of our natural capital assets and the running down of these assets. Past economic growth has relied on extracting natural capital at a rate faster than it is created, often converting it into apparent financial capital. Natural capital exploitation has occurred through pollution and direct damage including climate change and biodiversity loss.

Currently climate change and biodiversity loss represent a systemic risk to the global economy – a risk that is radically uncertain and long term. In unmitigated climate change scenarios there would be greater than 4 degree Celsius of warming by 2100[6], and a potential rise of global sea level of over 2 metres[7]. Between 1970 and 2016 the world saw an average 68% decrease in the populations of mammals, birds, amphibians, reptiles and fish[8], and according to estimates by the World Economic Forum[9] more than half ($44 trillion) of the world's GDP is moderately or highly dependent on nature.

Without including these outcomes, and the risks which crystallise to produce them, in our measurement of progress we create a fundamental blindness to the costs and barriers to managing these risks within macro-economic policy development.

When a quantified measure of national income was proposed by Simon Kuznets in 1934 in a report to the US Congress (National Income 1929-32)[10] he stated that "*The valuable capacity of the human mind to simplify a complex situation in a compact characterization becomes dangerous when not controlled in terms of definitely stated criteria. With quantitative measurements especially, the definiteness of the result suggests, often misleadingly, a precision and simplicity in the outlines of the object measured.*"

To address this challenge we need to reorientate our measurement of progress, the tools we use to manage risk, and our political incentives. This represents a paradigm shift in societal objectives, and the financial and economic frameworks that are currently in use.

"You're worse off relying on misleading information than on not having any information at all. If you give a pilot an altimeter that is sometimes defective he will crash the plane. Give him nothing and he will look out of the window." Nassim Taleb. 1997[11]

Economic growth, as measured by Gross Domestic Product (GDP), has been championed as the route to alleviate unemployment, reduce poverty and increase overall wellbeing. Indeed, in the first half of our great transition over the past century economic growth has delivered a huge overall increase in societal wellbeing. The average human has never been this old, wealthy, well-educated, healthy or well connected.

An initial 1% increase in GDP correlates with a 0.3 unit increase in reported happiness on a scale of 1 to 10[12]. Indeed, below a certain level of GDP per capita there is a precipitous fall in the reported happiness of individuals. However, above this level, about $70,000 per capita[13], then the return on investment is flat – so someone earning $700,000 or $700 million has the same reported happiness as someone on $70,000. This level broadly equates to the point at which the average person in a society has access to adequate health care, education and social systems. When these factors are accounted for the correlation between GDP and happiness weakens further. It does appear that our need to feel safe and secure is actually what drives our levels of happiness.

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[6] https://www.ipcc.ch/report/ar6/wg2/

[7] https://tidesandcurrents.noaa.gov/publications/techrpt83_Global_and_Regional_SLR_Scenarios_for_the_US_final.pdf

[8] https://www.worldwildlife.org/press-releases/68-average-decline-in-species-population-sizes-since-1970-says-new-wwf-report?msclkid=c7f2ee93cfa011ecadd66d61b47461d0

[9] https://www3.weforum.org/docs/WEF_New_Nature_Economy_Report_2020.pdf

[10] https://fraser.stlouisfed.org/title/national-income-1929-1932-971

[11] https://merage.uci.edu/~jorion/oc/ntaleb.htm

[12] https://econreview.berkeley.edu/beyond-gdp-economics-and-happiness/

[13] https://www.schroders.com/en/uk/adviser/insights/economics/should-investors-consider-happiness-rather-than-gdp/

While GDP as a measure is both simple and now familiar, GDP also counts a number of 'bads', with GDP increasing as a result of smoking or in the immediate aftermath of a natural disaster such as a hurricane. The lack of differentiation between 'bads' and 'goods' coupled with the lack of focus on distribution makes GDP, at best, a blunt tool in our measurement of progress.

The level of inequality is also matters and is often missing from our measures of economic progress. This has been exemplified recently through the campaigning of Jack Monroe where she highlighted that inflation for the poorest members of society was running at a significantly higher percentage than the average inflation in the UK[14]. Producing more stuff overall will not necessarily achieve an increase in average happiness, if it makes inequality worse. It is more likely to reduce happiness in an interconnected world where the inequality in distribution of that 'stuff' is easy to see on someone's Facebook, Instagram or TikTok account (or the latest WikiLeaks or Panama Paper release).

The expansion of GDP to include other measures is proposed as a solution.

There are two approaches proposed for this expansion – quantify through monetisation all other factors we wish to measure (whether happiness or biodiversity) and add these to GDP, or create a dashboard of measures one of which is GDP. In the UK the Treasury is now developing a suite of metrics that will be reported on by the Office of National Statistics in a dashboard approach. Further, the Government Economic Service's Technical Framework has committed to incorporating a number of these other measures such as the economics of biodiversity, potentially then being able to add them into one combined measure of prosperity.

Absorbing these metrics through a financialization of biodiversity or happiness into one uber-GDP should be rejected. This is because while quantification of factors might make them more directly comparable it is important to remember that some of these factors are really not comparable. Conscious decisions about trade-offs should be made rather than unconscious decisions buried within metrics. While the expansion of metrics through a new dashboard is to be welcomed, we need a transformation in mindsets that will allow this new information to actively inform decisions.

If we simply use GDP as our measure of success, and attempt to nudge this to include further data to capture more and more externality we will not succeed. Too much of this externality represents a systemic risk. Uncertainty, real Knightian uncertainty[15], exists along the pathways which society will walk, all the time that nature and the biosphere is delivering impact. There are tipping points, indirect impacts and uncertain outcomes. The timing of the effects of biodiversity loss and climate change are deeply uncertain. We need to slow down our desire to add numbers to our dashboards and speed up our ability to step back and consider what sort of society we want and how we can ensure that it is delivered.

With GDP used as an overall measure of progress, we also have a flawed system of appraising possible interventions to enable progress. In a recent survey[16] of economic modellers and policy makers across the European Union it was noted that policy development and appraisal is never neutral. The choice of data and models is always political and we therefore need to challenge and break the vicious cycle through which vested interests reinforce themselves and obstruct any radical changes to the current system.

Neoclassical economic theory has dominated our policy assessment processes and has informed our approach to financial and statistical analysis. Neoclassical economics is limited in its understanding and approach especially around the treatment of uncertainty, time, resources, finance, government and behaviour. All are vital points of understanding and intervention in any transformation.

Key tools developed within neoclassical economics such as general equilibrium models are powerful in helping understand small moves away from an equilibrium and the potential implications of this – as long as the assumption of an economy at equilibrium is valid and desired. If we wish to transform

[14] https://www.theguardian.com/books/2022/jan/26/terry-pratchett-jack-monroe-vimes-boots-poverty-index

[15] https://news.mit.edu/2010/explained-knightian-0602

[16] Royston, S., Foulds, C., Pasqualino, R., Jones, A., 2022, 'Masters of the machinery: The politics of economic modelling within European energy policy', Energy Policy, submitted

society and also believe that we are currently not operating optimally for the challenges that we face – and when we recognise that an optimal society still has uncertainty associated with it – then any model that tries to bring us back to our current equilibrium is flawed. This current limitation should be recognised as a political and ideological choice.

So what? If the world was infinite or we had plenty of time to innovate, make mistakes and create solutions to challenges through trial and error then eventually capitalism, in its new consumerism guise, would probably survive. However, the trends in resources and capital ownership have resulted in a significantly depleted world with ever increasing wealth accumulation by a small number of individuals. Therefore, we need to rethink the approach and create a political system and finance sector that is fit for the future.

Recommendation 1: Policy development and appraisal should recognise and be explicit about the ideological underpinning of measurement and analysis tools used for assessing change.

2. Changing the finance sector

There are plenty of studies, a lot of evidence and many good examples of individuals, groups and societies planning for the long term. By planning for the long term I mean giving up obvious short term gains in preference for long term returns. A good example is pensions. People save some money now, over long periods, to ensure they can retire in the future.

Meanwhile, the finance system has evolved to respond to small fluctuations in market sentiment in micro-seconds. It is not set up to support a change in culture that values the longer term. It will not deliver a transformation to a more sustainable and prosperous society. This lies at the heart of the challenge we face.

There are a number of barriers to changing our short-term focus. They are highlighted by various finance groups calling for action on climate change such as ClimateWise[17], the United Nations Environment Programme Finance Initiative[18] or the Institutional Investors Group on Climate Change[19]. This plea can be summarised as a need for policy that is 'long, loud and legal'[20]. This call is often dismissed by governments as flippant and not substantive. However, it is key.

Other than future emission targets there are limited ‘long’-term policies that will deliver against a transformation. Policies are not bold and ambitious so that they create a ‘loud’ impact in the sector they intend to change, and most initiatives are voluntary rather than ‘legal’. The underlying policies that set our strategic direction are ‘long, loud and legal’, and have been so for decades. However, as evidenced by the fact that around 7% of global GDP goes on fossil fuel subsidies[21], our strategic direction backed by governments is in the opposite direction.

Our current version of capitalism - corporatism - takes the private individual and moves their decision making powers into large entities that no one seems capable of controlling resulting in multinationals that are poorly aligned to societal goals. Even if one individual plans for the long term there is a disconnect with the processes of governance that force decisions to be made for the short term. Very quickly this disconnection can grow. Very quickly no one individual is trying to make capitalism work for the long term. Very quickly we end up with ‘ownerless corporations’[22] where the decision making in a large entity is so opaque the ultimate responsibility lies back at the door of shareholders who do not

[17] https://www.cisl.cam.ac.uk/business-action/sustainable-finance/climatewise

[18] https://www.unepfi.org/

[19] https://www.iigcc.org/

[20] https://www.theguardian.com/environment/cif-green/2009/may/27/climate-change-business

[21] https://www.imf.org/en/Publications/WP/Issues/2021/09/23/Still-Not-Getting-Energy-Prices-Right-A-Global-and-Country-Update-of-Fossil-Fuel-Subsidies-466004

[22] https://www.hrmagazine.co.uk/content/news/businesses-must-tackle-ownerless-corporations

even realise it. We only take note when the whole system starts to collapse and we need to 'rescue' it from itself.

Capitalism has brought huge benefits to the world. From raising the living standards of those of us fortunate enough to live in countries who adopted capitalism early on (the part of the world now called the developed world), to the huge technological advances that we have seen. This technological shift, in particular in transport and communication technology, has led to globalisation and an ever-connected world.

However, this rapid globalisation and technology expansion has also led to corporatism as rules invented for a smaller, more manageable world try to keep up with the pace of change. Our path towards corporatism has been fed at the individual level through consumerism, and the large organisations invest heavily in creating structures and feedbacks that reward this consumerism. Consumerism is short-term. It is a short-term self-consuming system.

Understanding the dependencies and impacts of business on climate change and nature is key to developing a robust strategy for changing the finance sector and bringing in the long-term. As outlined by the Taskforce on Climate-related Financial Disclosures (TCFD) and the Taskforce for Nature-Related Financial Disclosure (TNFD), reporting on these dependencies and impacts is needed across four key areas: governance, strategy, risk management, and metrics and targets. Within this frame the availability and comparability of data needs to be improved. While there are efforts to develop these standard approaches, such as the European Union's Taxonomy on Sustainable Finance, there needs to be more urgency in this space.

Within climate change a lot of been done to understand the impact of business through emissions, including direct emissions and indirect emissions caused by supply chains and the use of products (scope 1, 2 and 3 emissions). Similar understandings are required for biodiversity loss. Initiatives such as the TCFD and TNFD provide us with a framework for transparently reporting on the risks within business and should be welcomed, championed and supported across the sector.

There is a real risk, however, that both TCFD and TNFD will create a large volume of data without any substantive action. The assumption that disclosing risk will lead to adequate action is not borne out. Therefore, as risk disclosure standards and transparent processes are developed it is important to consider further policy to ensure businesses and investors act on that disclosed information.

There are specific policy barriers[23] associated with why investment does not flow into solutions that would underpin a system that supports long term societal resilience. These include policy complexity, policing and enforcement of obligations and incentives, overall governance within countries, existing (fossil fuel) subsidies and misaligned policies. Different barriers will of course be more important in some countries than in others - overall governance will be more of a concern in a developing country emerging from civil unrest, while misaligned policies may be more of a concern in developed countries with large existing fossil fuel infrastructure. However, there seems to be a lack of overall urgency in tackling these policy barriers at any scale in any country.

Alongside policy barriers there are domestic market barriers. These are more associated with risks in moving toward new investment vehicles and new technologies. For example, the capital costs of new technologies may be higher with risk premiums associated with technology uncertainty included. In addition, there is likely to be human and operational risk caused by a lack of trained people, there are limitations in the supporting infrastructure (electricity grids were set up to manage a high carbon base load rather than intermittent and distributed renewables), and there is a lack of track record in project developers and fund managers which makes trust low to start with.

When moving the whole planet towards a new financial architecture, with massive investments and countries starting from very different bases, there are additional risks including inflation, currency risks and return risks. There are also deal flow problems with new investment vehicles and sectors. It is difficult to diversify your risk if there is only one organisation currently offering a particular solution or technology.

[23] Hafner, S., James, O. & Jones, A., 2019, 'A scoping literature review of barriers to investment in climate change solutions ', Sustainability, 11 (11), 3201

On top of all this, there are physical risks. As the world experiences climate change we will see increasing drought, flooding, and forest fires which will impact on infrastructure, supply chains and demand.

The Capital Markets Climate Initiative (CMCI)[24] group of banks, pension funds, insurance companies, analysts and policy makers, set up by the then Minister for Climate Change Greg Barker MP, developed a set of policy principles[25] that would help tackle some of these barriers. These principles were developed following a series of consultations with senior leaders from across the finance sector with a focus on what would constitute a 'long, loud and legal' framework.

Importantly, CMCI found that the process of policy development should be transparent and include critical stakeholders (such as investors) from the beginning. A current focus for policy should be to drive and scale up radical innovation[26] to underpin the transition. Regulation can be used to increase the cost of capital to investments that lead to biodiversity loss or increase carbon emissions, alongside reducing the cost of capital for projects that provide adaptation to climate change or direct investment into biodiversity preservation. Price signals can support the deployment of sustainable alternatives including removing direct and indirect subsidies for fossil fuels, as well as providing targeted support for new renewable technologies. Standards such as building codes, equipment and appliance standards, waste standards, and transportation, are also important to align demand with the transition to net zero. All of these policy solutions are required to make the transition as efficient as possible.

If policy is successful in driving a net zero transition then one issue with a move to a new economic value system, with implications for finance, is how to move from where we are today to where we need to be without creating too great a discontinuity in market prices in the process. Over the last few years the work of Carbon Tracker has most eloquently captured this issue. If government climate policy sets an amount of carbon that we are allowed to emit into the atmosphere then organisations that own that future emission potential (the coal, oil and gas) are limited in what they can sell.

Indeed, Carbon Tracker[27] have shown that the amount of fossil fuels currently known to exist, or at least those which justify the valuations of fossil fuel companies on stock markets, far exceeds the amount we are allowed to burn if we are to meet the targets that governments have already agreed to under the United Nations Framework Convention on Climate Change (UNFCCC) through the Conference of the Parties (COP). Most recently COP26 in Glasgow saw governments reaffirm their pledge to keep global temperature rise below 1.5 degree Celsius as far as possible. So, the argument goes - but is rarely stated by those who made the pledges -, the companies with substantial stocks of carbon emitting fossil fuels are over-valued (governments will at some point stop them selling what they have) and their assets will become stranded.

The United Nations Convention on Biological Diversity (CBD), a parallel process to the UNFCCC, has been set up with the aim of delivering international agreements on conservation and the use of biological diversity. This process has led to several initiatives including the Aichi Biodiversity Targets[28] which were created in 2010. These targets comprised five strategic goals and 20 targets for the year 2020 – all of which were missed. The CBD, alongside the seventeen Sustainable Development Goals[29] (the SDGs), is now looking forward to a new set of targets and initiatives for 2030 mirroring the climate change transition.

However, given the long-term nature of biodiversity risks and the difficulty in creating a global aggregated target which is easily translated down to a national or organisational level, the approach

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[24] https://www.gov.uk/guidance/capital-markets-climate-initiative

[25] Jones, A., 2015, 'Perceived barriers and policy solutions in clean energy infrastructure investment', Journal of Cleaner Production, 104, 297

[26] https://eeist.co.uk/

[27] https://carbontracker.org/terms/stranded-assets/

[28] https://www.cbd.int/sp/targets/?msclkid=7928ca9dcfa711ec9dc0c6113299ced5

[29] https://sdgs.un.org/goals

to international regulation is more complex. For climate change agreements, one tonne of carbon dioxide emission anywhere in the world has the same impact on global climate change, whereas biodiversity loss is very local and specific. Therefore, biodiversity policy will need to include direct prohibition of financing and underwriting activities that hasten biodiversity loss at a local level. As a consequence, recent moves to ensure international law can be prosecuted in countries[30] where companies are registered as well as in countries where environmental damage occurs should be welcomed. More locally, the UK government has included legally binding targets within the new Environment Bill[31] but these need to be translated into business relevant actions as rapidly as possible.

The economy, and investors, have over the past century relied on a steady stream of low cost and easily accessed energy to drive growth. The high capitalisation in oil, gas and coal industries has driven economic growth and provided apparently significant returns on investment. However, oil and gas are now increasingly costly to extract and the continued exploitation of this resource results in significant externalities (climate change, pollution and biodiversity loss) which are now causing economic and financial losses across all sectors, and feeding risks which seem highly likely to crystallise as losses, as costs, over time. These more recent trends, alongside moves to divest from these assets and to capture these externalities as actual costs, have led to volatility in the prices of these commodities and asset valuations, as well as the potential for stranded assets.

While regulators, and professional bodies, are increasingly aware of these issues there is still no fundamental shift towards managing these risks although there are some early signs of progress. We need to repurpose the finance sector to be fit for the future.

Recommendation 2: Implement a set of policy principles to underpin financial market reform to manage transition risks and unlock opportunities.

3. The price of actuaries

Given this context what is the role of finance, and in particular of actuaries, in navigating, informing and leading the second half of our great transition over the next century?

Actuaries, as the risk quantification profession, have over the past decade responded[32] to global environmental damage by embracing the need to better understand these challenges. The Institute and Faculty of Actuaries (IFoA) has helped to lead some of the narrative[33] around this change but now needs to go much further and faster if it is to support an actuarial profession and help create a finance sector, both fit for the future. Currently, finance professionals, including actuaries, are facilitating both climate change and biodiversity loss.

The prevailing trend towards the financialization of all risks and bringing the externalities associated with the impacts of climate change and biodiversity loss within decision-making tools through quantification is an important step. However, as already noted by the IFoA[34] and its thought leadership champions, this will not in itself solve the problem. Indeed, as a profession we need to embrace uncertainty with enthusiasm, and recognise the qualitative nature of some of the knowledge associated with these challenges. We can, and should, use our skills and influence to work with complexity in a complex world. We need to encourage a culture that allows a critique of how things are done and a recognition that our existing methodologies are often not fit for purpose.

Developing a better understanding of our current financial sector practices that act as a barrier to sustainability is key. Central to this is the short-term nature of finance. However, tackling short

[30] https://mine.nridigital.com/mine_jul20/canada_miners_international_law

[31] https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted

[32] https://atc.ifoagroups.org.uk

[33] https://www.actuaries.org.uk/news-and-insights/media-centre/media-releases-and-statements/ifoa-warns-climate-change-financial-risks

[34] https://www.actuaries.org.uk/system/files/field/document/Biodiversity_NatCap_Sessional.pdf

termism is not a simple barrier to overcome. Neither is it the only barrier. The sector needs to recognise that finance is not a neutral medium, and financial intermediaries are not objective functionaries in organising and sharing market information. The 2008 global financial crisis and the current state of the world illustrate a systemic issue that needs to be surfaced and addressed.

The recommendations outlined in this paper partly originate from a workshop I hosted with the IFoA at Staple Inn in May, 2019[35]. That workshop brought together twenty-five individuals from across the finance sector including senior and junior members of the IFoA. Individuals came from regulatory bodies, professional bodies, financial organisations, consultancies and networks with job titles ranging from Chief Investment Officer to Senior Pricing Actuary. Three roundtable discussions were held to explore issues around the short-term nature of the sector and the tools that are used within the profession to inform advice.

The participants outlined four groups of barriers to change across the profession which were:

- Mindsets
- Skills
- External drivers
- Decision boundaries

The clearest barrier identified during the workshop was the individual actuaries' mindset. This related to a number of issues within the profession but mostly focussed on how data was used and for what purpose. Actuarial science is excessively mathematical with a lack of recognition of any potential risks to this approach. The 'known-unknowns', and even some of the 'known-knowns', within environmental and social sciences are 'unknown-unknowns' within the actuarial profession. This 'economism' within the profession reduces the advice it can provide to a very narrow function.

While qualitative data will become more important, standard sets of scenarios that are more granular and relevant to the finance sector should be developed. These scenarios should initially be used to develop and test governance processes. Scenarios should be developed with an academically robust underpinning and include both direct and indirect impacts on business. Indirect impacts will be felt through supply chain disruptions, political and societal risk, environmental liability, product liability and overall economic instability as well as potential exposures due to changes in the regulatory environment.

Markets are inherently interconnected and large-scale shocks could propagate rapidly through all sectors. The scenarios should explore tipping points and non-linear responses within the climate and natural capital systems and how these may cause rapid changes to material risks faced by business. As noted earlier the World Economic Forum have recently indicated that half of global GDP is moderately or highly dependent on nature. However, what is the other half dependent on? Scenarios should test the resilience of all sectors to substantial loss of biodiversity and disruptions to supply chains including food[36]. If the cost of food were to increase following a shock to the environment what would this do to workers, the general economy and disposable incomes?[37]

Recommendation 3: Actuaries as individuals should step back and challenge their own mindsets and open up their tools to allow more qualitative data use.

4. Actuarial skill

There is, at the very least, a culture within the actuarial profession that does not champion a critique of how things are done, why they are done in that way and whether they should change. The process of engaging with climate change as an issue saw, arguably, the finance sector as the last to embrace the need for change and the first to embrace climate scepticism.

[35] Jones, A., Taylor, N., Hafner, S., Kitchen, J., 2021, 'Finance for a future of sustainable prosperity', AREA, 53 (1), 21

[36] https://www.lloyds.com/foodsystemshock

[37] https://www.theguardian.com/environment/2015/aug/14/food-production-shocks-will-happen-more-often-extreme-weather

Indeed, many argue that it is the work of the finance sector to maximise profit while minimising the disclosure of risk. For example, accounts and risk disclosures are predominantly for the benefit of those who provide capital, and often the multiple stakeholders involved (including members of a pension fund) are not properly considered. The real wider societal risks are not disclosed.

The key to ensuring risk disclosures make a difference is to understand what the purpose of business is, and what it should be. If there is no requirement across the economy to enhance the social or environmental value of an organisation, or to contribute to the overall resilience of society, then no amount of risk disclosure will lead to this outcome.

Therefore, the hierarchy of decision making needs to be clear – especially with regards to where responsibility for decisions falls. For too long in the finance sector, including the IFoA, change has happened because of well-placed (or persistent) individuals rather than anything systematic which responds to the challenges we face. While these individuals are no longer alone, and continue to grow in numbers, the scale of change envisaged to reach net zero, tackle biodiversity loss and reduce social inequalities is so great that the process of decision making and responsibilities needs to be clear, transparent and formally structured to be able to respond.

While a key skill that needs to be nurtured and developed across actuarial practice is the use of qualitative data supporting the need to develop scenarios and make informed judgements, this should be set in the wider expectation of the profession to contextualise risk. This would allow more narrative reporting to inform decisions and push the profession away from drawing narrowly from an underlying academic discipline which is often hidden.

Within the training and requirements for qualifications of an actuary, neoclassical economic theory dominates the development of the quantitative analysis approaches. Neoclassical economic thought has been shown to treat uncertainty, time, resources, finance, government and actor behaviours poorly[38]. All of these contribute to the challenges we now face and inform the transition we must make. New tools are needed to broaden the scope of advice. The limitation of the current tools should be better understood and articulated. Social value needs to be brought back into our thinking, alongside a better understanding of the theory of the firm and economic agent behaviours.

Actuarial tools also undermine future thinking. A lot of our processes are based on the analysis of past data. In a world undergoing a transformation this approach is simply not appropriate. This habit, this barrier, is not confined to the actuarial profession of course but is widespread across the finance sector. This is clearest when considering the short-term nature of finance. The use of metrics, tools, models and discounting positively reinforce a very short time horizon approach. However, during the workshop it was highlighted that even the definition of long term was not clear with some putting this as only beyond one year (outside of the mark-to-market requirements) and others linking it to decades matching to pension liabilities.

The IFoA needs to reconsider the tools of the profession and widen the exams and accreditation process for actuaries which have, over time, become more specialised, more quantitative and therefore narrower. Exams, and learning, should encourage individuals to critique the tools they are being given so that this ability is brought into all aspects of actuarial science and advice throughout the career of an actuary.

Recommendation 4: The IFoA should champion change within the profession by calling for a radical overhaul of the skill set required by actuaries.

5. Balancing stakeholder audiences

What is a public good in today's society? Is it the land on which we grow our food, the infrastructure that provides us with healthcare and education, or the air which we breath. If we focus on the public

[38] OECD, 2017. New Approaches to Economic Challenges: Towards a new Narrative. Organisation for Economic Co-operation and Development, Paris

goods that the public sector has demonstrated a strong desire to protect - those things that the public sector will not allow to fail, collapse or be undermined - then we are forced to look at a relatively strange 'public good'. Our multinational banks have become our public goods. They are too big to fail. Nature, on the other hand, is failing.

While professional bodies, such as the IFoA, have a remit to act in the public interest, the definition and implementation of this is often secondary, or at least confused. For many of the challenges the world now faces, and outlined earlier in this paper, the finance sector has been self-governing with a myriad of voluntary schemes set up. This is dangerously circular and can readily be seen as a conflict of interest, especially if the duty to act in the public interest is largely lost. The workshop participants recognised this and called for greater regulation, including macroprudential risk management, to ensure a level playing field. They called for real action to address the challenges to be taken in a clear and consistent way. Supporting this, initiatives such as the Taskforce on Climate-related Financial Disclosures (TCFD) and the Taskforce for Nature-Related Financial Disclosure (TNFD) are to be welcomed if they provide a more transparent, open access route to risk data for all stakeholders.

When contributing to financial regulation, government calls for evidence or policy design processes, we need to consider which stakeholder voices are heard. Any approaches should reflect the different perspectives of those stakeholders as fairly as possible. This is particularly true in the case of valuation methods used in policy development or business decisions. The valuation of a particular ecosystem or climate impact may be very different if you include cultural, spiritual or social considerations. The value of a tree for someone living on the other side of the world is very different to the person who uses that tree as shade every day.

The impact of policies on these stakeholders and the distribution of that impact across stakeholders should always be considered. Both intergenerational and intragenerational equity needs to be considered. Within finance this is particularly important when considering concentration of wealth through capital accumulation.

It would be very simple to solve climate change while shifting the inequality in the world from oil billionaires to new cleantech billionaires. The transition to clean technologies may be far easier if inequality is addressed, or at least far more difficult if they are not. Witness the Gilets Jaune protests in France when fuel taxes were increased[39].

Recently inequality has worsened during periods aimed at creating financial stability such as the years after the global financial crisis and during Covid. Fiscal policies have often focussed on stabilising the value of financial assets, assets most often owned by the already wealthy. Today 1% of the global population owns 48% of total assets[40]. The top 0.1% of people in the USA own about the same wealth as the bottom 90%.[41]

The second half of the transition that we are about to embark on over the rest of this century should include considerations for societal equity to ensure that society is as resilient as possible to shocks and that everyone can benefit from this transition. Long term considerations mean we should no longer end up in a place where countries are reliant on single points of failure or where the supply of critical resources is so intertwined with geopolitics that a cost of living crisis is the only outcome we can expect from increases in demand for a scarce resource coupled with supply constraints due to a necessary global response to expansionist autocracies[42].

We must acknowledge the decades of underinvestment in the real public goods that would have created a prosperous and resilient society.

Actuaries already work within frameworks that bring fairness into decision-making such as Treating Customers Fairly (“TCF”) and Principles and Practices of Financial Management (“PPFM”). Actuaries also often consider intra- and intergenerational fairness in their work – especially as it relates to

[39] https://theconversation.com/gilets-jaunes-may-be-the-start-of-a-worldwide-revolt-against-climate-action-112636

[40] https://policy-practice.oxfam.org/resources/wealth-having-it-all-and-wanting-more-338125/

[41] https://www.theguardian.com/business/2014/nov/13/us-wealth-inequality-top-01-worth-as-much-as-the-bottom-90

[42] https://www.newstatesman.com/politics/uk-politics/2022/03/how-phasing-out-russian-oil-could-deepen-the-cost-of-living-crisis

pension funds[43]. These concepts can be extended to support the assessment of environmental and other justice issues.

In early 2021, the Biodiversity Working Party of the IFoA published a paper on biodiversity justice[44]. It recommended the adoption of a framework[45] to support actuaries to incorporate further justice issues into their work. This framework breaks justice down into four concepts:

- "recognition" – inequality and discrimination must be recognised and considered;
- "participation" – all those affected must be involved in the decision-making process;
- "distribution" – resources must be allocated as fairly as possible; and
- "socio-ecological" justice – nature must be considered as a participant.

This framework should be incorporated into a set of new guidelines for actuaries within the IFoA.

An unjust transition is likely to increase societal tensions and translate to higher litigation risk, reputational risks and health risks for marginalised and impacted communities. Balancing stakeholder perspectives is a key actuarial skill.

Recommendation 5: The IFoA should develop guidelines that encourage actuaries to use a justice lens in financial governance and decision-making processes.

Concluding thoughts

We are half way through a global transition – one that has already delivered real benefits across the world with contributions to human knowledge and well-being beyond all expectations. However, it has also brought us to the brink of a collapse in the natural world on which we rely. Our efforts in the second half of this transition should focus on fixing this impact, while celebrating the achievements.

Over the past decade we have seen a significant increase in public pressure and recognition of sustainability issues including the school strike movement and wider social demonstrations on women's rights, black lives matter, and democracy. Further to this there are pressure groups, and voluntary moves within the finance sector bringing focus on financial institutions and their responses to this set of global challenges. We are now at the cusp of a push to regulate and embed real change within and across finance and financial management to allow society to transform into a system fit for the future.

Within the context of this global transformation what is the purpose of actuarial science, or indeed, an actuary?

It has been clear throughout my engagement with the profession, and the individuals within the profession, that there is a strong appetite for change. It is also clear that we are currently locked into a system that does not work. The main purpose of the actuarial profession currently, as described in the workshop hosted in London in 2019, is to sell the ability to 'sleep at night' rather than be awake to really exposing, and then helping to manage, the risks and uncertainties that we face.

This paper outlines the need to recognise the limitations of our current practice, both as actuaries but also as a global economy. We have made ideological choices on how we run the economy, our businesses and our profession. Occasionally these have been conscious choices, but often they have not. Not only must we transition our economy away from the risks that it now faces, but we must

[43] https://www.actuaries.org.uk/news-and-insights/public-affairs-and-policy/intergenerational-fairness

[44] https://www.actuaries.org.uk/system/files/field/document/Biodiversity_Justice_Sessional.pdf

[45] Boelens, R., Vos, J., & Perreault, T. (2018). Introduction: The Multiple Challenges and Layers of Water Justice Struggles. In R. Boelens, T. Perreault, & J. Vos (Eds.), Water Justice (pp. 1-32). Cambridge: Cambridge University Press. doi:10.1017/9781316831847.001

transform it into an economy that is fit for the future. This is a radical change at scale which will impact all that we do. Actuaries can, and should, make a significant contribution to meeting these joint challenges.

Within this transformation we need to put people at its heart. We need to think why we are doing things, why they are set up in certain ways and what the benefits are and to whom. We need to think in the long term and maximise the shared prosperity that can be delivered by a seismic shift in the practice of finance.

There is a need to widen the skills used within the actuarial profession to be able to respond to these challenges. This includes the need to embrace more qualitative data, and the conceptual tools that allow this data to co-exist within governance processes alongside quantitative data. Further, the transformation necessitates a move to widen the underlying ideology used to develop the tools of actuarial science away from neoclassical economics. In particular, the use of systems science, alongside other econometric approaches (such as agent based modelling), can offer insights. New frameworks such as that proposed within the Dasgupta Review[46] around the three capitals (productive/economic capital, human capital and natural capital) can also offer more holistic measures of national wealth.

Given these challenges, five recommendations are highlighted in this paper:

- ***Recommendation 1:*** *Policy development and appraisal should recognise and be explicit about the ideological underpinning of measurement and analysis tools used for assessing change.*
- ***Recommendation 2:*** *Implement a set of policy principles to underpin financial market reform to manage transition risks and unlock opportunities.*
- ***Recommendation 3:*** *Actuaries as individuals should step back and challenge their own mindsets and open up their tools to allow more qualitative data use.*
- ***Recommendation 4:*** *The IFoA should champion change within the profession by calling for a radical overhaul of the skill set required by actuaries.*
- ***Recommendation 5:*** *The IFoA should develop guidelines that encourage actuaries to use a justice lens in financial governance and decision making processes.*

We should remember throughout that, as actuaries, it is "*recognised that a key part of our strategy is to speak up on relevant matters of public interest and to raise awareness of the work of actuaries and the value we add to society*" (Governance Manual of the Institute and Faculty of Actuaries (paragraph 1.63), Institute and Faculty of Actuaries, 2020)[47]. This calls for a broader definition of public interest away from actuaries applying the regulation given to them competently or merely maintaining professional standards.

There are many opportunities to be unlocked in this second half of our great transition. The vision for actuarial science, actuaries and the profession as a whole, must be one that helps to unlock those opportunities for all, rather than one that tries to keep us as close to business as usual as possible. There is no business as usual. The world has changed. Let us, as actuaries, change with it.

[46] https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review

[47] https://www.actuaries.org.uk/system/files/field/document/Governance%20Manual%2C%20v.5.0.3%20-%20June%202020.pdf

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