Institute and Faculty of Actuaries

The IFoA's Research in Economics

Actuarial Teachers and Researchers Conference 2019

27 June 2019

The IFoA's Research in Economics

- **Part 1 – Background to economics research in the IFoA**
- Part 2 – "On Economic Thought and Actuarial Practice" by Dr Iain Clacher, University of Leeds

Institute and Faculty of Actuaries

Recap of IFoA's Major Research Programmes

IFoA's governing Council authorised >£3m funding for research in early 2016.

3 major research proposals were selected by the Research & Thought Leadership Board (RTLB):

1. **Modelling, Measurement and Management of Longevity and Morbidity Risk**
2. **Minimising longevity and investment risk while optimising future pension plans**
3. **Use of Big Health and Actuarial Data for understanding Longevity and Morbidity**

These cover traditional areas of actuarial practice.

Institute and Faculty of Actuaries

Research outside the 3 major projects

- RTLB recognised that this left a gap: Non-traditional areas of interest, economics and the environment, including climate change.
- Council authorised additional funding to fill this gap in two areas:

1. Behavioural finance
2. Economics

- This presentation is about the IFoA's research in these areas.

Institute and Faculty of Actuaries

Why is economics important for actuaries?

- Modern actuarial practice relies on financial economics.
- Currently, financial economics flows directly from traditional (i.e. neoclassical) economic theory.
- Regulation is influenced by financial economics.

- It is also important to understand the economics of climate change.

Institute and Faculty of Actuaries

The introduction of financial economics to UK pensions actuaries – Part 1

The 1990s

- Change in accounting rules. FAS87.
- Discount rate harmonization at AA rated corporate bond level
- Balance sheet recognition of assets at market value and liabilities on bond basis led to increased volatility
- Regulation led to hardening of pension promise – benefits no longer discretionary
- Publication of Exley Metha Smith 1997 “The financial theory of defined benefit pension schemes”, applying financial economics to corporate DB schemes.

Institute and Faculty of Actuaries

The introduction of financial economics to UK pensions actuaries – Part 2

The 2000s

- Pension promises are now guaranteed
- Pension fund assets are valued at market prices in line with accounting rules.
- Investment strategies moved away from equities towards bonds
- Financial economics goes mainstream.

Institute and Faculty of Actuaries

Summary

- In the late 1990s actuarial practice in pensions moved away from traditional methods which allowed non-market valuation of assets.
- Towards financial economics which applies strict market valuation.
- Arguably, this was necessary at the time to save the profession from becoming irrelevant, due to the general shift towards mark to market accounting and rise of mathematical finance.

- But, since the 2007/8 financial crisis, questions have been asked about traditional economic theory.

Institute and Faculty of Actuaries

The 2008 Financial Crisis was a watershed

6th November 2008*

"The Queen spoke for the nation yesterday when she asked how the credit crunch could have taken so many economics experts by surprise.

"She described the financial crisis as 'awful' and inquired that, since the meltdown was so massive, 'Why did nobody notice it?'"

Institute and Faculty of Actuaries

*http://www.dailymail.co.uk/news/article-1083290/Its-awful--Why-did-coming--The-Queen-gives-verdict-global-credit-crunch.html#ixzz2YoV8VGec

The financial crisis was also a crisis for economics

Adair Turner, on the need to "reconstruct" economics*[1]

- "… one oversimplified strand [of economics] dominated in the pre-crisis years"
- "… do we really need … to "reconstruct economics"? My conclusion is that we do."

Joseph Stiglitz, Nobel prize winning economist

> "… models said that financial markets were always efficient. Remarkably, standard macroeconomic models did not even incorporate adequate analyses of banks."

Paul Romer, 2018 Economics Nobel prize winner*[2]

"For more than three decades, macroeconomics has gone backwards."

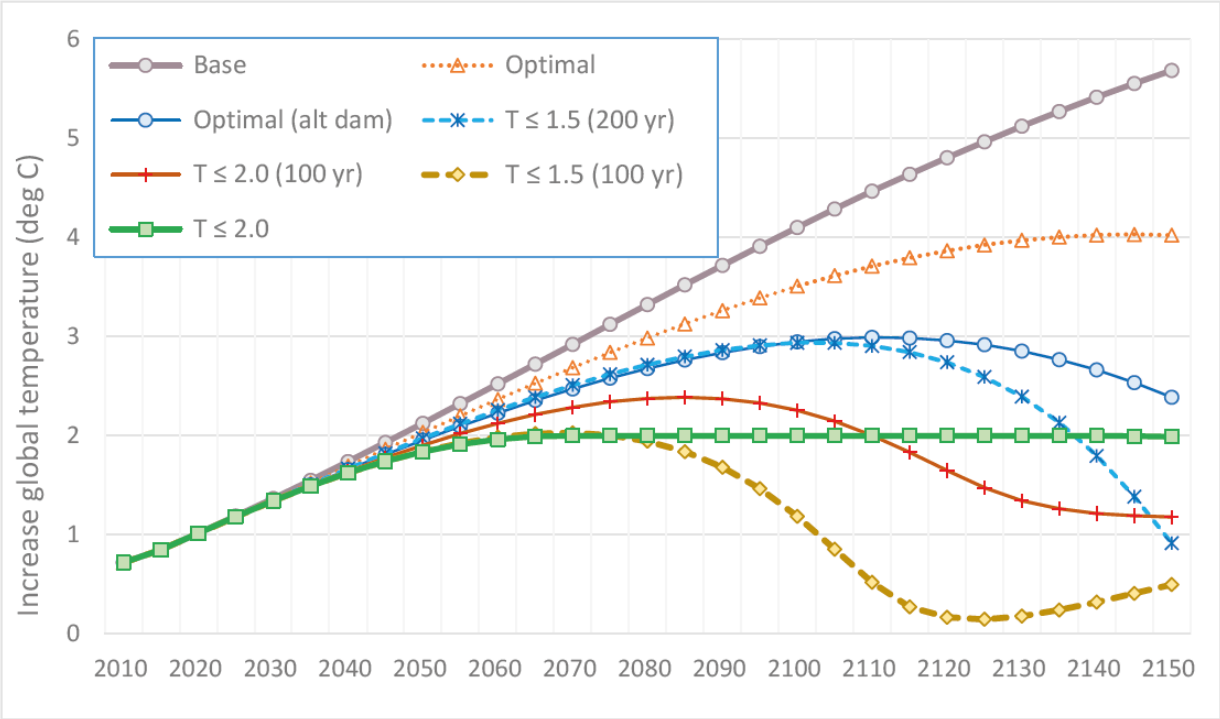
On Real Business Cycle theory: "The noncommittal relationship with the truth revealed by these methodological evasions and the ... dismissal of fact goes so far beyond post-modern irony that it deserves its own label. I suggest 'post-real.'"

Institute and Faculty of Actuaries

*[1] Source: "Economics After the Crisis", by Adair Turner, MIT Press 17 April 2012

*[2] Source: "The trouble with macroeconomics", Paul Romer, 2016

Issues With Economic Models for Climate Change



- The economist William Nordhaus has developed the 'DICE' economic model which compares costs vs benefits of climate change mitigation.
- 'Optimal' ultimate global temperature increase is 4°C.
- But the IPCC have recommended a safe limit of 1.5°C.

?

Institute and Faculty of Actuaries

Source: "Climate Change:The Ultimate Challenge for Economics" William D. Nordhaus, Yale University Nobel Lecture in Economic Sciences, 8th December 2018

Some of the groups investigating economics

The following organisations/initiatives on economics have sprung up:

- Institute for New Economic Thinking
- OECD New Approaches for Economic Challenges
- ESRC Rebuilding Macroeconomics Network Plus
- Rethinking Economics
- Promoting Economic Pluralism
- Prime Economics
- UCL Institute for Innovation and Public Purpose

Institute and Faculty of Actuaries

OECD
BETTER POLICIES FOR BETTER LIVES

New Approaches to Economic Challenges

The 2008 financial crisis damaged people's lives, the economy and economics itself

2008 was a shock to the system and a wake-up call...

Showing us that conventional economic analyses and models were insufficient to address the complexity of the modern global economy.

Most economists didn't see the crisis coming

There were lone voices warning about unsustainable debt and the housing bubble, but most economists and policy-makers failed to appreciate the extent of the interlinkages between the financial sector and the real economy. Furthermore, at the start of the crisis, almost no one – including the OECD – expected the effects of the crisis to last this long and bring about such change to our lives and how we should prepare for the future.

The crisis changed the OECD

People and planet at the core

The OECD changed its mission to "better policies for better lives", shifting from promoting growth as an end in itself to focus on well-being. We are addressing income and wealth inequality. Growth must also be sustainable, building a healthy environment for better lives. As part of this process, we launched the New Approaches to Economic Challenges (NAEC) initiative, updating our analysis to redefine what growth means, looking at how people's lives can be made more fulfilling, through a new social contract. We are looking at new models and other disciplines in addition to economics that take into account other factors shaping people's decisions - their hopes, aspirations, culture, identity, – to adapt our thinking on policy and data.

New data and tools

We are looking beyond GDP as a measure of success, thanks to our Inclusive Growth initiative and tools such as the Better Life Index.

OECD Conference 15-16 April 2019 New analytical tools & techniques for economic policymaking

Angel Gurria

- Financial crisis showed previous economic understanding not working. Need to understand economy as an open system, constantly evolving, interacting with society and environment. Use systems thinking to get new policy insights
- NAEC innovation lab jointly headed by chief of staff, chief economist and chief statistician.

New economic tools and models, agent based and system dynamic models are being used to e.g.:

- Investigate causes of obesity
- Investigate financial instability

Institute and Faculty of Actuaries

Rebuilding Macroeconomics

Research / Blog / Events / Media / Newsletter / About

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

Globalisation Hub

Read more ›

Macroeconomic Instability Hub

Read more ›

Macroeconomic Institutions Hub

Read more ›

Social Macroeconomics Hub

Read more ›

Sustainable Growth Hub

Read more ›

Macroeconomic Finance Hub

Read more ›

"Rebuilding Macroeconomics is a diverse and extensive network of mainstream and heterodox economists and academics from anthropology, biology, complexity, finance, history, philosophy, physics, psychology, sociology. Our Network brings together academics, policy makers, representatives of civil society and interested members of the public. Our aim is to transform macroeconomics into a policy-relevant social science."

Institute and Faculty of Actuaries

Traditionally mainstream economics is the Neoclassical School

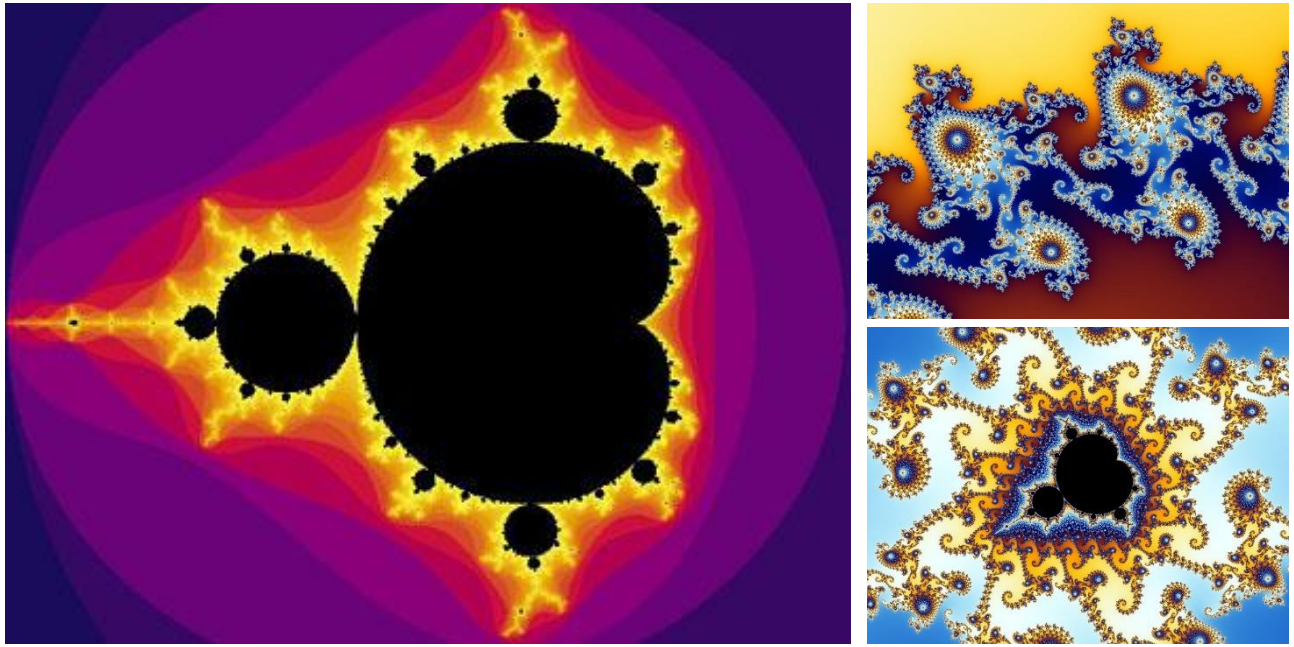
- Economics in the past became synonymous with one particular school of economic thought: neoclassical economics.
- Neo-classical economics assumes that individuals make choices:
  1. With rational preferences,
  2. Attempting to maximise their utility, and
  3. Acting with perfect information
- Also assumes the economy is an equilibrium system.

Optimisation + Equilibrium = Neoclassical Economics*

Institute and Faculty of Actuaries

* Paraphrased from “Misbehaving: The making of behavioural economics” by Richard Thaler

Newer economic thinking examines complexity



- Mandelbrot set was discovered relatively recently in 1980
- Example of very complex patterns emerging from simple non-linear equations
- Complex systems exhibit emergent behaviour

Institute and Faculty of Actuaries

The IFoA's investigation of economics

- How does the IFoA respond to these changes?
- To understand our need for research in economics we first need to know how economic theory is **currently used** in all areas of actuarial practice.
- Hence our project, led by Dr Iain Clacher, to survey the IFoA's use of economic theory.

- Dr Clacher has also been working on an IFoA research project to investigate **behavioural biases** in institutional investors.

Institute and Faculty of Actuaries

Behavioural Finance: Investigating Institutional Investors' Decision-Making

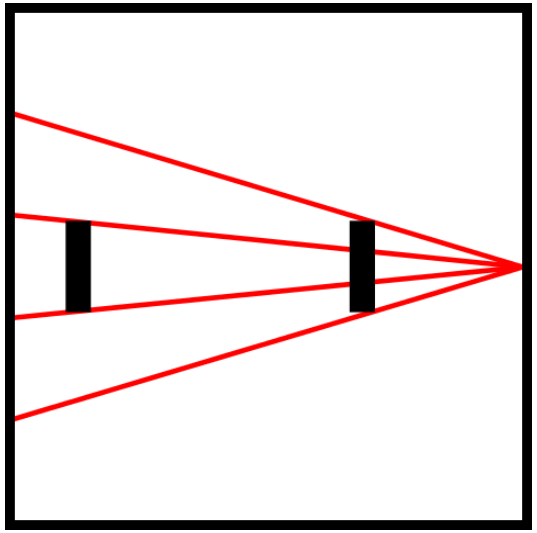
Project introduction:

- Most of research in behavioral finance focused on individuals: limited research on institutional investors
- IFoA funded investigation of decision-making biases in pension fund trustees
- This is joint academic research by City, Leeds, and UEL, together with Ipsos and supported by Aon and Invesco
- Combination of qualitative and quantitative research

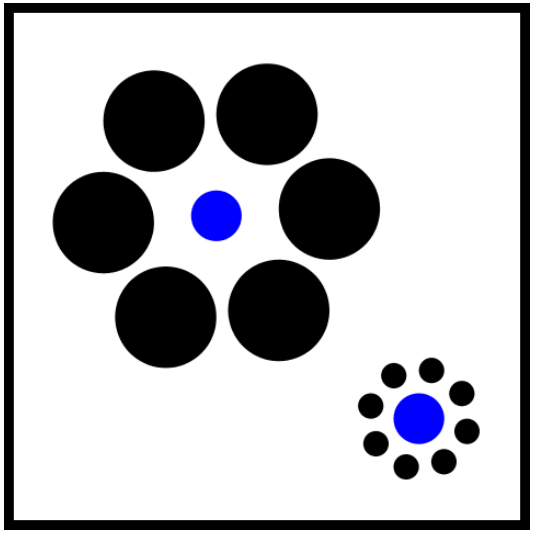
Institute and Faculty of Actuaries

Cognitive biases

- Cognitive biases such as visual illusions do not imply that we cannot navigate the world successfully



Ponzo Illusion



Ebbinghaus Illusion

Areas covered

Pension fund trustees:

- Who are they and what motivates them?
- How are decisions made?
- Relationships with advisors
- Influences and attitudes towards investment and risk

Quantitative experiments

- Data collected on-line and in person from 208 trustees
- Trustees accessed via AON, Invesco, and AMNT
- Final report will show findings from 5 experiments
- All experiments based on scenarios familiar to trustees (e.g., “We would like you to imagine that you are a trustee of a DC pension scheme. As part of your duties, you must help select the default investment funds.”)
- This is an on-going initiative: Data is still being collected, more experiments are in the pipeline

Experiment 1: Naïve Diversification Set-up

2 Funds - Balanced

Fund
FTSE All-Share companies
FTSE UK Conventional Gilts All

4 Funds - Balanced

Fund
FTSE All-Share companies
FTSE 100 companies
FTSE UK Conventional Gilts All
FTSE UK Conventional Gilts over 15 years

2 Funds – Unbalanced/Shares

Fund
FTSE All-Share companies
Balanced Fund (50% FTSE All-Share, 50% FTSE All Gilts)

4 Funds – Unbalanced/Shares

Fund
FTSE All-Share companies
FTSE 350 companies
FTSE 100 companies
FTSE UK Conventional Gilts over 15 years

There were 2 more conditions unbalanced towards bonds

Experiment 1: Naïve Diversification Results

Condition	Bond % (95% CI)
Balanced	63% (56%~69%)
Bond-Heavy	70% (63%~76%)
Equity-Heavy	44% (37%~51%)

Condition	Concentration (95% CI)	Funds Chosen
2 Funds	0.67 (0.63~0.71)	1.8 (1.6~2.0)
4 Funds	0.44 (0.39~0.49)	2.8 (2.6~3.0)

- The Mix of Funds influenced the proportion allocated to bonds ($p<.001$)
- All trustee types showed the same bias ($p=.13$)

- The Number of Funds offered influenced the number of funds chosen and concentration between funds ($p<.001$)
- All trustee types showed the same bias ($p=.27$)

Institute and Faculty of Actuaries

Other Experiments

- Framing/context effects
- Surrogate decision-making
- Influence of advice
- Fund selection criteria
- Chasing past performance vs fee minimisation

The IFoA's Research in Economics

- Part 1 – Background to economics research in the IFoA
- **Part 2 – "On Economic Thought and Actuarial Practice" by Dr Iain Clacher, University of Leeds**

  N.B. Sections in italics are extracts from quotes from contributors, non-italic parts are from Dr Clacher's analysis and commentary.

  The report can be downloaded here:

  https://www.actuaries.org.uk/news-and-insights/news/diversity-economic-thought-why-it-matters

Institute and Faculty of Actuaries

“On Economic Thought and Actuarial Practice” by Dr Iain Clacher, University of Leeds

Aims of the project:

1. Understand the interplay between economic thought and actuarial practice.
2. Understand the consequences of current approaches to economics.
3. Set out an agenda for the profession such that it gains the most benefit from its use of economics as a discipline, and not some potentially limiting subset of it.

“New ways of economic thinking are already manifest, and the prominence of such approaches is growing. However, for the Profession to ask the right questions of economics, broadly defined, this requires going back to first principles about the role of the actuary and actuarial work.”

Institute and Faculty of Actuaries

“On Economic Thought and Actuarial Practice”

Researcher/Author:

- Dr Iain Clacher, University of Leeds

IFoA research staff:

- Fiona Darwin, Chuxx Onyia

Steering Committee:

- Sam Achord, Oliver Bettis, Alex Waite, Martin White

Additional Review by:

- Philip Bennett, Con Keating, Andrew Slater, Jon Spain

Institute and Faculty of Actuaries

Methodology

- Dr Clacher carried out 12 qualitative interviews between October 2017 and May 2018
- Approach was based on snowball sampling. Allowed deeper investigation of complex issues than a large scale survey.
- Target interviewees: senior actuaries, senior economists and academics – experts in a specialized field, normally hard to reach in surveys.
- Semi-structured interview protocol, not check-box survey. Allowed interviews to evolve based on what was said during the interview.
- Off-the-record (with one exception)

Institute and Faculty of Actuaries

“On Economic Thought and Actuarial Practice”

Preface:

“…when I first encountered actuaries thirty years ago, I was astonished that they seemed to know nothing about economics. And now I think they know almost too much about economics, in the sense that, as it seems to me, they've taken a whole pile of stuff from financial economics on board, as if it were kind of some established truth...”

Professor John Kay

Institute and Faculty of Actuaries

Interview analysis – Economic Scenario Generators

- *"…we tend to use a lot of historical data, and I think there's only a limited amount of saying, ''What do we think the economic theory says?'', and there's quite a lot more of, ''What has the data shown?''. So we are therefore of course implicitly assuming the future looks like the past."*

Institute and Faculty of Actuaries

Projections vs Forecasts

- “A key insight from this work is the **difference between a projection and a forecast**, and it was in the design of the survey instrument that this distinction emerged. Actuaries working in long-term business would say they make actuarial projections not forecasts, although this distinction is not often verbalised… However, one open question is whether users of actuarial information understand this nuanced distinction and crucially a misunderstanding of this impacts investment decisions and potentially spills over into other areas such as risk management and regulation.“

[my emphasis]

Institute and Faculty of Actuaries

Risk and Uncertainty

- One of the major challenges in economics is the difference between risk and uncertainty
- there are historical roots to this problem that led to a world where rational economics and, by extension, financial economics assumed that all risks were knowable from distributions.

Institute and Faculty of Actuaries

Risk and Uncertainty

- *"…you have Keynes and Knight on one side talking about uncertainty as something that is fundamentally distinguishable from risk, and you have others … who deny that there is such a distinction. There's a nice quote that comes from Friedman's text,* Price Theory *– you can almost call that the defining text of Chicago economics – that says, "I've not referred to Knight's distinction between risk and uncertainty because I do not believe it is valid. We may act as if we can define probabilities in relation to every conceivable event. So that's … the idea that people have an articulated or articulable set of subjective probabilities about everything." And that's, essentially, the underpinning of most of financial economics and quite a significant part of modern microeconomics."*

Institute and Faculty of Actuaries

Regulation

- For those outside of the profession, there is a clear and obvious economic position underpinning how regulatory structures, however well-intentioned, are operating in terms of the impact on investment and the real economy. One crucial aspect of the above interaction is this comment "*So, what putting a significant part of your pension into long-term bonds is doing is giving you the certainty of a low standard of living in retirement, and it's not clear that that's what people want."* As noted above, in almost no discussions within the profession is the micro human impact of actuarial modelling debated. Moreover, macro-issues, such as the impact of skewing real investment, are almost never debated and discussed as a matter of course.

Institute and Faculty of Actuaries

Education and CPD

- There is a fundamental challenge with actuarial exams moving towards an ever more quantitative approach, while economics, as a taught subject, is moving in the opposite direction.
- The consequence of this is that there is the potential for herding and group-think in the profession. A broad understanding of economics as social science is lost, and is reduced down to a prevailing orthodoxy that, while mathematically tractable, does not allow for a deep understanding of economics as a discipline or what different perspectives mean for actuarial work.

Institute and Faculty of Actuaries

Education and CPD

- Secondly, there is the acknowledgement of a feedback loop between conformity with economic thought and its reduction to specific views of the world, and regulatory structures that are applied to pensions and insurance. It is also the combination of these two factors that may be stoking up significant issues for the future as there is regulatory herding.

Institute and Faculty of Actuaries

Recommendations from the Report

The report finishes with 6 recommendations for the IFoA:

1. **Actuarial education should emphasise economic plurality and present a broad spectrum of economic thought** so as to equip actuaries with the critical insight into the social and philosophical nature of the discipline. All too often it is presented and accepted as some sort of unassailable truth.
2. **Actuaries must ensure that users of actuarial work understand the nuance of it, i.e. projections vs forecasts**, and also that users understand the limitations of actuarial work.

Institute and Faculty of Actuaries

Recommendations from the Report

3. **The profession needs to articulate what it needs from economics as a discipline.** New ways of economic thinking are already manifest, and the prominence of such approaches is growing. However, for the profession to ask the right questions of economics then, broadly defined, this requires going back to first principles about the role of the actuary and actuarial work. Areas key to the profession that economics is unlikely to have a good answer for are challenges such as: ‘’What do we think future returns are going to be and what will be the sources of these returns? What can be learned from a historical perspective on the drivers of economic growth and ultimately returns to investment? How do issues such as climate change impact on expectations of future returns?’’

Institute and Faculty of Actuaries

Recommendations from the Report

4. **The link between actuarial practice and investment must be closer if not re-established.** A telling comment from one interviewee was that there used to be an investment actuary in life companies but that these roles disappeared. Investment has therefore become the domain of others and not of actuaries. As the people best placed to engage with risk and uncertainty in the long-run, it seems sensible that investment decisions should have greater input from actuaries than is currently the case.

Institute and Faculty of Actuaries

Recommendations from the Report

5. **There needs to be more challenge and thinking about regulation by the profession** and sharing that thinking with those who create it, i.e. better engagement with regulators to help inform and shape the regulatory landscape. Too often in the interviews the reason given for doing things was “It’s the regulation” followed by some unhappiness or acceptance that the regulation is not optimal and may have unintended consequences, ranging from skewed investment to systemic risk.

Institute and Faculty of Actuaries

Recommendations from the Report

6. **The profession needs to ensure that the expectations as to what modelling and actuarial work can achieve are properly set.** Work such as that carried out by the working party that examined ‘Facing up to uncertainty with professionalism’ is a good example of this. However, the challenge is arguably greater, as this must extend beyond the profession to users of actuarial work, as well as to government and regulators whose expectations may be too high.

The report can be downloaded here:

https://www.actuaries.org.uk/news-and-insights/news/diversity-economic-thought-why-it-matters

Institute and Faculty of Actuaries

Next steps for the IFoA's economics research

Rebuilding Macroeconomics Second Annual Conference 2019

- Investigate how to better estimate long-term investment returns.
- IFoA will host a meeting in Edinburgh to correspond with the Rebuilding Macroeconomics conference

Institute and Faculty of Actuaries

Questions

Comments

The views expressed in this [publication/presentation] are those of invited contributors and not necessarily those of the IFoA. The IFoA do not endorse any of the views stated, nor any claims or representations made in this [publication/presentation] and accept no responsibility or liability to any person for loss or damage suffered as a consequence of their placing reliance upon any view, claim or representation made in this [publication/presentation].

The information and expressions of opinion contained in this publication are not intended to be a comprehensive study, nor to provide actuarial advice or advice of any nature and should not be treated as a substitute for specific advice concerning individual situations. On no account may any part of this [publication/presentation] be reproduced without the written permission of the IFoA [*or authors, in the case of non-IFoA research*].

Institute and Faculty of Actuaries