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Economic Thought and Actuarial Practice

by Dr Iain Clacher, Leeds University Business School

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‘On Economic Thought and Actuarial Practice’

Dr Iain Clacher, Leeds University Business School

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“...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...”¹

Professor John Kay

¹ This opening quote from Professor John Kay is identified with his consent. Professor Kay, CBE, FRSE, FBA, FAcSS is a leading British economist. He is a visiting Professor of Economics at the London School of Economics and has been a fellow of St John's College, Oxford, since 1970.

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Dr Iain Clacher

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1 Selected extracts from this report

This report is based on a series of interviews, and there are a number of quotes from those interviews in italics throughout the report. The author felt that an executive summary would detract from the report rather than enhance it. Instead, the following extracts have been chosen to give a flavour of the subject matter and to encourage readers to read the whole report.

“The aim of this paper is threefold. Firstly, to understand the interplay between economic thought and actuarial practice. Secondly, to understand the consequences of current approaches to economics. Thirdly, to set out an agenda for the profession to enable it to gain the most benefit from its use of economics as a discipline, and not some potentially limiting subset of it.”

“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.”

“There is ... a need for actuaries to possess a broader skill-set or at least a willingness to be intellectually curious outside of the narrow confines of mathematics and statistical modelling, in order to be effective in their roles.”

“The answer to the ... question is that actuaries are potentially passive recipients of economic thought rather than proactive and challenging of the economics that impacts on actuarial practice. Such an answer may be provocative, but it is an important observation, as the actuarial profession does not operate in isolation from the development of economic thought.”

“A complex financial situation when reduced to a single number gives simplicity and some would argue consistency. However, what is lost is usefulness. Therefore it may be more appropriate to recognise the multiple dimensions across which risk and uncertainty operate so that in mitigating one risk, one must accept more of another risk, or in some instances that the action may generate new risks. The consequence of this observation, and something that was borne out in the interviews, is that it is important to keep the regulatory framework under constant review; it should be the servant of society’s needs rather than the master.”

“The profession needs to articulate what it needs from economics as a discipline. There are lots of approaches to economics and there is a tool kit that exists but is not utilised properly. 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 that are 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?"

"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 is therefore the domain of others and not of actuaries. As the people best placed to engage with risk and uncertainty in the long run, it only seems sensible that investment decisions have greater input from actuaries than is currently the case."

"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."

"Finally, the greatest challenge, and this is also present in the quote from Warren Buffet, is that everything is inherently uncertain, and it is the ability to accept this and respond appropriately that is likely to be the differentiator between success and failure in the long-run."

2 Introduction

This report was commissioned by the UK Institute and Faculty of Actuaries (IFoA) and is focused on the UK situation, though the discussion may be of interest more widely. In this report I use the term 'profession' to denote the UK actuarial profession as a whole.

The actuarial profession's relationship with economics is one that is both interesting and fractious. The discipline of economics features, albeit in a small way, in actuarial training and is often part of conversations between actuaries or is mentioned in passing in presentations, sessional papers, and so on. However, how economic thought, rather than views on the economy, relates to actuarial practice is a question that has not been given sufficient attention to date. This distinction may seem trivial; it is not. It has serious implications for actuarial practice, regulation, and the long-term sustainability of both pensions and insurance.²

The branch of economics the profession is most engaged with is financial economics. Since Exley, Mehta, and Smith (1997), financial economics has been the prevailing orthodoxy in pensions. A similar story also emerges in insurance, around the collapse of Equitable Life and a move towards market-based regulatory regimes e.g. Solvency II.

At this time (historic) there was arguably a level of opacity in the pensions and insurance industries that was not conducive to the operation of these institutions as long-term enterprises. The consequence of this was that regulators struggled to identify both potential and actual problems within these industries. Looking at market values and using solvency-type measures therefore had its place in allowing relevant stakeholders (sponsors, trustees, insurers, regulators, etc) to try to understand the potential risks they were exposed to.

However, within the profession, prior to the publication of Exley et al (1997), debate raged as to the appropriateness of the new approaches arising from financial economics and their application to defined benefit pensions.³ At the heart of this debate was the question as to whether the actuarial models being used, which had served the profession well and been developed over many decades, should just be discarded. While the financial economics approach became the default method for valuing defined benefit pensions, there remains a wide range of views across the profession and it is clear from this research that the alternatives continue to be debated to this day.

There is an additional context to this work that is important to emphasise. Since the global financial crisis of 2008, there has been a significant amount of soul searching and questioning of rational economics and, by extension, financial economics. In 2008 there was a famous question raised by the Queen on a visit to the London School of Economics with

² Arguably for defined benefit pensions this longevity is all but capped and these schemes will be run-off over the coming decades. The debate here is whether this is a good thing. Were financial economic models the cause of this by bringing to light a risk that was not well understood or was it the wrong measure leading to unintended consequences? This is not a debate for this paper, and I suspect is one that will continue to be played out elsewhere for many years to come.

³ See, for example, *Being actuarial with the truth: A story of economic confusion over defined benefit pension schemes*, Carne (2004) or the discussions of Cowling, Gordon, and Speed (2005).

respect to the credit crunch, 'Why did nobody notice it?'⁴ The reason is, it seems, rather obvious: nobody was looking in the right places as the models suggested all was well.⁵

Across many parts of economics there has been a push towards more critical thinking about the discipline and the assumptions used in economic modelling, e.g. rationality or market efficiency. Moreover, there is a more general push towards plurality of economic thought, as seen by student demands for a broader economics syllabus, and not one that is predicated solely on free-markets and neo-liberal economics.⁶ However, despite the questioning and challenging of these schools of economic thought, there has been limited debate within the actuarial profession about the major failings of these paradigms in 2008 or what these failings could mean for actuarial practice.⁷

The aim of this paper is threefold. Firstly, to understand the interplay between economic thought and actuarial practice. Secondly, to understand the consequences of current approaches to economics. Thirdly, to set out an agenda for the profession to enable it to gain the most benefit from its use of economics as a discipline, and not some potentially limiting subset of it.

At this point it is important to state that this work is not an attempt to dismiss financial economics completely. The core message from this paper, and the most important result of the work, is that economic plurality is the defining characteristic of well-applied economic understanding. Economic theory is simply that – theory. It is a way of viewing the world, and so to use only one lens for all economic problems or the same economic problem can, through time, have unintended consequences. A broadening out of the way in which the profession uses economics is therefore needed. Consequently, financial economics is was useful and remains so in several contexts. However, over-reliance on markets and mathematically tractable models may be making long-term institutions short-term in their outlook, giving a false sense of security to firms and to regulators and skewing long-term investment in the real economy. This is a bold statement but one which illustrates a key challenge to the profession. If any or all these statements are true, then the challenge is how can the profession look to rebalance and influence a situation for the good not only of the profession but society as a whole?

The next section of this paper briefly sets out the analytical approach used in researching the relationship between economic thought and actuarial practice.

⁴<https://www.telegraph.co.uk/news/uknews/theroyalfamily/3386353/The-Queen-asks-why-no-one-saw-the-credit-crunch-coming.html>

⁵ Which can be seen as a serious challenge to the academic economic community for the future Besley/Hennessey letter to the Queen <http://wwwf.imperial.ac.uk/~bin06/M3A22/queen-lse.pdf>

⁶ <https://www.theguardian.com/business/2013/oct/24/students-post-crash-economics.html>

⁷ Although the existence of this project goes some way to rectify this.

3 Survey methodology; semi-structured interviews

The methodology for this research is a qualitative interview approach based on snowball sampling, which uses referrals and networks to access hard-to-reach populations.⁸ For the target interviewees (practising actuaries, senior economists, academics, or highly regarded and senior actuaries) this is the most appropriate methodology. These interviewees are experts in a specialised field, who often work for large corporations or institutions and are, as a result, hard to reach.

For the actual interviews themselves, a semi-structured interview protocol was developed that covered the main areas of interest in order to understand the extent of the problem. However, the benefit of a semi-structured approach is that it allows for the interview to evolve based on what is said during the interview rather than rigidly conforming to a script. It allows for a much deeper investigation of complex issues than can be achieved through a large-scale survey. Given that exploring the use of economics in practice is inherently complex, and itself is intertwined with technical approaches to risk modelling, regulation, and the need for a historical perspective, it would be almost impossible to develop a broad survey instrument that would allow for a rich set of findings. Moreover, the time it would take to complete such a survey would inevitably mean that response rates would be too low for any meaningful insight.

Between October 2017 and May 2018, a total of 12 interviews were conducted. Where possible, these were conducted as face-to-face interviews. Where this was not possible interviews were conducted by telephone or Skype. The interviews ranged from around 45 mins to approximately two hours.

Interviewees spoke 'off-the-record' and so their titles/specific roles/employers are not given in any of the quotations. As such, quote attribution is given as 'Trustee, Large Pension Fund', for example. This approach enables the reader to understand something about the individual who has made the point, e.g. their role and experience, while maintaining the anonymity of the individual and means the quote is not directly attributable.⁹

This method allows different views to be highlighted and the weight of prevailing views can be used to reach a general conclusion. Moreover, statements used in earlier interviews can be used in future interviews to further triangulate insight. Most quotes are therefore shown with some attribution information as described above and this has been agreed with the relevant interviewees to ensure the quote, and its interpretation, are correct.

⁸ This approach does not follow many of the assumptions supporting conventional notions of random selection and representativeness. However, that is a natural consequence of social systems and to mitigate this, as much as is practicable, a diverse group of initial interviewees was sought, which has been achieved for this study.

⁹ The opening quote of the paper from Professor John Kay is identified with his consent.

4 Interview analysis

4.1 Economic scenario generators

One of the major areas of discussion was the role of Economic Scenario Generators (ESGs) in actuarial practice. Significant insight was gained into approaches used by the pensions and insurance industry, both in terms of modelling and with respect to its economic assumptions.¹⁰ There were three key themes raised by interviewees when discussing ESGs, each of which are discussed below:

4.1.1 Who determines the appropriate assumptions to use?

In terms of the design of ESGs, one of the most insightful discussions was around what happens when ESGs are being built for clients. While there was an acknowledgement that models can be built that are consistent with market efficiency or not, with constant volatility or stochastic volatility and so on, it was not, at least in the first instance, seen to be the role of the model builder/vendor to have an opinion on these factors.

“I built a large number of economic scenario generators and as a software vendor, you need to make your software flexible, so you need to be agnostic about things like mean reversion and you offer a variety of different models. Some will have constant volatility. Others will have stochastic volatility. Some will be consistent with market efficiency. Some of them will not be. Some will have Wilkie-style mean reversion and some of them wouldn't. You've got to be agnostic about many of those things, from the point of view of supplying the software.”

Former Partner in an actuarial consultancy

However, this agnostic situation leads to some interesting questions as to who is accountable for assumptions, and the reality is more nuanced as some clients need help in arriving at their assumptions.¹¹

“There would be a sort of discussion which led to the drawing up of the contract and then the contract says, use these assumptions. And the contract says, X is only liable to the extent that they've not followed the instructions, not consistent with the letter. So, there's a bit of a black hole, a black hole of accountability, as to where those assumptions come from. Because legally those will rest with the client, so they've signed a piece of paper to that effect. Though to the extent that they don't really know what they're doing, there have been suggestions from consultants, they might steer them in one direction or another.”

Former Partner in an actuarial consultancy

Where ESGs are being built internally to help clients make decisions, there are some assumptions about the economy and some sort of expectations about how particular

¹⁰ This subject matter was discussed in most interviews but for those interviewees outside of actuarial practice then it was not a subject they could comment on.

¹¹ There is also a wider question as to who is responsible for the model? This is a major concern and through the external reviewing of this paper, a reviewer has mentioned that this question is perhaps even more important than the assumptions feeding in to the model itself.

relationships will behave. However, this is not grounded necessarily in economic theory but more on historical observation and heuristics from past experience overlaid with views about the 'likely' trajectory of the future.

"I think there are some, I don't know quite how to describe them, economic principles, I'm not sure if they're quite as strong as principles, or just kind of rules of thumb, embedded into our ESG structure. One example is that we have a cascade structure, a model, things like equity return has an excess over cash. There's obviously a link between cash and equity, if cash returns go up, equity returns go up, so there's a limited amount of that built in. I think it's, a lot of what we do, because it's very, you know, we need lots of data; so the models are quite granular, so 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."

Actuary and ESG Specialist

However, there was evidence of some deeper thinking about the economy as well. In looking at responses and discussion about ESGs, it is hard to disentangle assumptions that seem to be financial e.g. risk-premia and asset returns which are necessary, with thinking that goes beyond this into the real economy and what could be driving growth and what this means for financial returns.

"My sense of these ESG models is they rely quite heavily on assumptions about inflation, interest rates, market prices, forward rates. Well, they must at least make some assumptions about rate of growth of share prices, and I would say that rate of growth of share prices in the long run must be very similar to the rate of growth of earnings and dividends. And that is very similar to the rate of growth of prices plus whatever real gains there are. If there are real gains in the economy, the real gains may be split between capital and labour, i.e. between dividends and wages. They may get distributed in a rather funny way, in that some people may get very big pay rises and other people may get none. But even so, I count that as wages doing well, even though it's all in the hands of one person."

Actuary and former Head of Investment, large insurer

Within the context of ESGs a crucial factor is how such models are updated to reflect new information/expectations. It is common for there to be some sort of internal committee within firms that does the 'hard thinking' about markets, the economy, inflation expectations, etc and it is here that updates to models are decided. However, the basis for updates is often pragmatism over theory.

"...so until maybe two years ago, if you'd have asked about negative interest rates, we'd have said, no, you know, maybe yeah and maybe just some very occasional market anomalies. But in terms of a modelling assumption, we assume they stay positive, obviously, and we were proved wrong (laughs). So we then had to change our, we then changed our models. We went through this thought process, as so many did, about well, okay what do we do now... if the floor isn't zero, where is it? But I don't think... I've not seen anything to say that there is any strong economic theory, so people have come up with economic arguments about where it might be, but you know, it seems to be pretty much a gap, so it was very

much, again a very fairly empirical kind of approach... Yeah, pragmatic is probably the right way of putting it."

Actuary and ESG Specialist

4.1.2 Projections versus 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.

"I think we would... we'd pretty much go along with that and say, no, we're not trying to forecast. So forecast, I think we would see as, what do we think is going to happen; projection is more about, if we make the following assumption then this will happen. Again, in practice it's a bit more grey because we kind of you know, we do... to some extent, almost sort of, put a line in the sand and say, here is an assumption that, I think at least in principle, we try to be honest about the credibility of that, particularly in the long term. You know, we're going to be as wrong as anybody else, but I suppose – perhaps the way to square the circle is to say, you need to plan on some basis, we think this is a sensible basis to plan on, but any long-term plan needs to be monitored in the short term, and as events change, you change your mind."

Actuary and ESG Specialist

However, one open question is whether users of actuarial information understand this nuanced distinction and crucially whether a lack of understanding or misunderstanding of it impacts investment decisions and potentially spills over into other areas, such as risk management and regulation.

4.1.3 Model risk and uncertainty

The final area of interest on ESGs concerned model risk. One thing that emerged very clearly from the interviews with those involved in ESGs and modelling of this type was an understanding of the presence of model risk and a detailed and nuanced understanding of the limits of models. However, a common theme was that many other users of actuarial information were not aware of this and a lack of understanding in this context clearly has implications and is consistent with the concern arising about the public understanding of the difference between a forecast and a projection.

"Because there's a degree of ignorance at board level or at the level of senior employees who simply can't have the technical knowledge to understand whether or not the model is reliable or its results. The people who are involved in the everyday application of the model can't necessarily explain what people at board level want to know. Of course, the board or other senior employees don't want to admit ignorance and those using the model don't want to admit that they are providing stuff that's not useful. And you sort of have the possibility of a sort of Emperor has no clothes situation."

Academic Economist

The organisational reality of how models are developed and built is again well-understood by those who build them, and this has implications for the application of model output and how it is used and interpreted.

“The larger the organisation the more you have to find ways to subdivide that responsibility for understanding what are the different bits of the model, and you do end up with models where no one individual understands everything that’s going on inside the model ... And I would be surprised if anybody would make a claim that they did understand the whole of the models, they’re all that complicated. So, while you might say it’s undesirable that people make decisions based on models that they don’t really understand, actually for an organisation beyond a certain size that’s inevitable. So, if you’re going to say, well that shouldn’t happen at all, then you’re going to say, organisations should not get bigger than this size where somebody can get their head around it.”

Former Partner in an actuarial consultancy

The last part of the story around model risk is the fact that there is a lack of honest discussion and communication about the limits of models. This is particularly true when it comes to the difference between risk and uncertainty.

“What that really comes down to on the side of the model is model risk and the fact if you speak to most people that are working with models they say, “Well, it’s OK. But...” And they’ve always got caveats for everything, because they understand that this is a very useful tool, but its limits are manifest and there are plenty of them. And that conversation never goes out all the way. Of all the problems that we see, how much of it is driven by a lack of honesty about model risk and the inability of models to deal with uncertainty? Because models are really good at probabilistic risk. But actually, they’re not very good at uncertainty, because nothing can really model that.”

Academic Economist

One thing to note in all of the discussion is the absence of any mention of the baseline risk when using models; that is to say we do not know the status quo prevailing at a point in time as it is that point that any ESG models will expand from i.e. projecting forward in 2007 vs 2008 would generate hugely different outcomes.

4.2 Interactions between economics and actuarial practice

One of the major challenges in economics is the difference between risk and uncertainty and 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.

“...I kind of somewhat stylise as the 1920s standoff which says you have Keynes and Knight on one side talking about uncertainty as something that is fundamentally distinguishable from risk, and you have others – Ramsey, de Finetti, then Savage – 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 taking comprehensibly on board 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."

Economist

However, for many of those interviewed who are engaged in the building of actuarial models there is an understanding of this debate and its implications.¹²

"Yes, and there's the old stuff about – what is it? – people make slightly pedantic differences between risks and uncertainty. One of them, you can get a probability distribution, and the other one, you really don't know what the probabilities are at all. I agree with that. Another is about known unknowns and unknown unknowns."

Actuary and Former Head of Investment, large insurer

In accepting some level of uncertainty of outcome, rather than say parameter uncertainty in the statistical sense, there is an acceptance of the limits of models.

"The thing that will hit you is something you hadn't thought of. If you had thought of it, then you've probably taken precautions against it, like set up a one in two hundred probability reserve. And what will actually come along is something you would never have thought of."

Actuary and Former Head of Investment, large insurer

4.3 Regulation

There are significant concerns about the role of regulation, the purpose of regulation, and in some instances, the circular nature of some of the conversations that arose over the course of the interviews. From the statement below, it is clear those outside the profession see regulation through a different lens.

"It's saying again and again that regulation is about helping to get industry structures, incentives and values right. And if you think you can run it by externally imposed rules, you'll just... There's a lot of it, this incredible naivety about what regulation can do. People don't seem to understand that of course regulation is going to be about box-ticking because box-ticking is what people employed in a regulatory agency can do."

Economist

¹² The full quote from Price Theory, by Milton Friedman is "In his seminal work, Frank Knight drew a sharp distinction between *risk*, as referring to events subject to a known or knowable probability distribution and *uncertainty*, as referring to events for which it was not possible to specify numerical probabilities. I have not referred to this distinction because I do not believe it to be valid. I follow L. J. Savage in his view of *personal probability*, which denies any valid distinction along these lines. We may treat people as if they assigned numerical probabilities to every conceivable event. Sometimes people will agree – we then may designate probabilities 'objective'; sometimes they will not – we then may designate the probabilities 'subjective'. But this classification is itself subject to change."

Again, in the context of regulation, there was an acknowledgement that, in some instances, risk may not be being managed. Instead, the *measurement* of a liability was being managed, e.g. holding matching assets to the valuation basis rather than managing risk.

Interviewee

“...when people match out/hedge out, I think they’re thinking about it too precisely that it’s going to be successful and they’re not thinking about the unknowns that are coming in. You’re matching an estimate that’s going to change over time. You’ve got lots of regulatory change that can come in and alter things drastically, political risks, etc, etc. They’re not thinking about the impacts of those, but they are actually micro-hedging something that is very much an estimate.”

Interviewer

“So, do you think that then leads to this thing that there’s a bit too much comfort in thinking that risk has now been sort of cracked in some way?”

Interviewee

“Yes, very much so. I think it’s a point made a few times today¹³, I think people believe far too much in their calibrations and in their models and that actually makes it worse.”

Actuary – Head of Investment consulting team

Regulation was often mentioned with respect to what goes on in practice, i.e. we do things this way as the regulation tells us this is what we must do. However, such a view falls into the box-ticking trap as set out above. While these boxes must be ‘ticked’ in current regulatory frameworks, there seemed to be a lack of challenge with respect to these structures, and they were accepted as a universal truth rather than something to be critiqued, debated and, where possible, moulded to make them more effective in achieving the goals of pensions and insurance sectors.

“And the problem is that actuaries are trying to interact at the analysis level, not the narrative level. And because they don’t look at narratives and are not willing to interact and try to change narratives, they just become doulos¹⁴, or they have a very doulos-like approach to things and they’re not willing to try to change things.”

Investment Professional in financial markets industry

Moreover, the economic consequences of not engaging in the larger debates is often ignored. As such, the prevailing orthodoxy is accepted at a macro level without fully thinking through what macro level regulation etc implies for micro outcomes, e.g. what does this do to someone’s pension savings, or more normative issues such as should individuals be

¹³ These discussions come from the same interview and so the interviewee is referring to other comments made previously in the interview that people place far too much weight on their models as having managed risk.

¹⁴ Doulos is a Greek word used in biblical times to denote someone born into slavery

expected to manage their own finances over the long-run if they are awarded a pay-out where significant and life changing injuries have occurred.¹⁵

Interviewee

“...which is scary, the extent to which people have been pushed into long-term bonds, which are well, another phrase I use is to say that a lot of what is going on here, which goes back to the definition of risk we were talking about, is confusing certainty with security. 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.”

Economist

Interviewer

“With that regulatory-type approach to pensions and insurance – so, in pensions you'd say gilts plus, and in insurance you have some solvency-type basis – how much do you think regulators then understand about risk and uncertainty, given the way in which activities are then governed? So, de-risking, matching assets, quite significant reserves in insurance.”

Interviewee

“Well, since the dichotomy between the majority of the practical people in the industry who have no idea, really, what is going on in terms of these exercises but ... think these are clever people and must know what they're doing – and it's not unreasonable for them to think that – and the people who are actually devising these structures who, basically, as we said earlier, have done courses in financial economics, they have come to believe that it's true in some sense.”

Economist

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.

However, there was a general view about the role of risk in the economy and the way in which regulation has evolved, in that the system seems to have arrived at a position where

¹⁵ Historically, such individuals would have received an Ogden lump sum, but more recently insurers are sometimes having to pay out lifetime annuities under periodical payment orders (PPOs) which transfer the longevity and investment risks from the individual to the insurer, and such liabilities can often stretch to 50 years or more.

all risks are managed and that we are covered. This seems to be driven by two factors. Firstly, that low-risk is the modus operandi of the regulatory regimes.

“And indeed, yes, or exactly we could be too risk averse. So yeah, I think that’s a valid point as well, that we take, it can be taken too far to the point where you do become so risk averse and you’re trying to manage everything and not, but actually running the risk by the business, or taking the risks that you do need to take in the longer term and that sort of thing. I think there is a sense that some probably would say we’ve become too risk averse in the insurance industry, in effectively trying to manage everything, and even though the regulators say, we’re not a zero-failure regime.”

Actuary and ESG Specialist

Secondly, what is asked of firms and by extension actuaries is a wholly unreasonable exercise, especially around extreme events.

“It would be better, in my view – and I’ve never discussed this much in public – for the supervisors, the regulators, to think of a slightly different model, like one in twenty over five years. One in twenty looks a lot weaker, it’s a lot lower level, but, it’s a different level, but putting it over five years also makes it quite strong, and that’s easier to estimate. The one in two hundred, I think, is unreasonable to estimate. In effect, you could say I was being asked, what is my estimate of the worst shipping disaster in the next two hundred years? To which not I or anybody else has the slightest idea. I don’t even know what the worst in the last two hundred years was because nobody knows what Titanic cost, for example.”

Actuary and Former Head of Investment, large insurer

Another open question is, therefore, what do current regulatory regimes achieve, particularly when everyone is assessed on the same basis with little or no flexibility? Such a regime could be argued to be rich with systemic risk.¹⁶

4.4 Education, continued professional development, and thought leadership within the profession

The final part of this project focussed on thought leadership with respect to economics and the profession. This covered a wide-range of areas but can be distilled down into training and education and intellectual curiosity about economics and how it interacts with actuarial practice.

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.

“I think the actuarial exams have become – well first of all, economics as a university subject has become more and more abstract and is taught in a way that makes it more difficult for

¹⁶ Andy Haldane, Chief Economist at the Bank of England, has also made a similar point on the nature of regulation. See, The Dog and the Frisbee: https://www.kansascityfed.org/publicat/sympos/2012/Haldane_final.pdf

people to understand economics conceptually. And even the mathematical economics is not that well taught. And secondly, the actuarial exams have I think moved even further away from classical and conceptual economics. I don't think anybody like me who did a pretty classical economics course, which was fantastic from the point of view of the presentation of classical theory and had very little econometrics in and all but no maths in, could do the actuarial exams today."

Academic Economist

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.

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.

"I guess the big thing would be if you're using anything it's the way you use it or that it's the character of the person that's as important. So that's not something you can legislate for in any kind of huge way, but I think overall actuaries have a very simplistic or very basic understanding of economics or they have a very much conformist approach. There is very, very big herd-like behaviour, very big groupthink. The regulatory environment is becoming more group think like as well. So, it's – those things are normally an accident waiting to happen, but the accident normally doesn't happen for a long time. I think that's kind of the bigger issue."

Investment Professional in financial markets industry

There is therefore a need for actuaries to possess a broader skill-set or at least a willingness to be intellectually curious outside of the narrow confines of mathematics and statistical modelling, in order to be effective in their roles.

"I definitely agree with the two schools - the other way that you might characterise them (and I think it's largely the same people) is those who kind of see the role as relatively narrow or I'm going to be a specialist in life insurance valuations or whatever and end up doing that and those who are much broader. I think a lot about the wider fields, because I think about quite a lot of what I do as being wider fields, but it's more kind of who has the flexibility to take the basic actuarial thinking into different areas."

Actuary in government

Last, there is the issue of what actuaries should be doing with respect to understanding economics and thinking about investment, valuation and risk management. Actuarial roles have become ever more siloed and separated from investment.

"But that does mean that the economy is very uncertain, and when I was an Economics Research Manager in a large insurer, my job was looking at these sorts of things, precisely

in order to tell the investment department what the prospects were, and so I got used to thinking in this way. But for actuaries in general, there are far fewer actuaries, I think, who are now involved in investment than there were fifty years ago.

Being an investment manager is not a major occupation of actuaries. It used to be, and when I was the Economics Research Manager, all the traders and senior people in the investment department were actuaries, except for one, who was an economist, and I would expect now that there are no actuaries in the investment department. They've changed themselves over to a different type of company which would work with the standard sorts of people that go into investment management, whatever they may be; people with MBAs or accountants or economists, or whatever, and not actuaries."

Actuary and Former Head of Investment, large insurer

This decoupling of actuarial work from investment has consequences with respect to critical thinking and gaining real insight and understanding of investment for the long-term to meet long-lived liabilities.

"It is what I think about it. It's beautifully written and it cuts through so much. But there's a vignette which has just come over time to understand more and more the significance of it, which says that one of his colleagues who wasn't in strategy or, indeed, in economics came and sat through a few of his classes and, at the end of it, said to Rumelt, "You know, there's only ever really one question, which is "What is going on here?"¹⁷

Economist

It is possible to answer such deep questions, which are clearly necessary to address the types of long-run challenges of pensions and insurance, but to do so is far from easy and requires a significant level of reflection and critical appraisal of current practice and past failings.

¹⁷ The quote from Rumelt is taken from Richard Rumelt's book, *Good Strategy, Bad Strategy*.

5 Next Steps for the profession

In summing up this work, it is my hope that some of the wider context and the motivation for this research comes across in the introduction. The actuarial profession and actuaries are fundamental to the institutions that matter for the financial security of the majority of individuals in society, and while actuaries can be found across a range of financial spheres, e.g. banking, it is their role in pensions and insurance that is arguably the most important. Moreover, actuarial skills and experience are relevant, if not core, to addressing many of the challenges in managing uncertainty in these institutions over long time periods.

The objective of this initial stage of research was to answer the profession's question "Where are we today?" and to a lesser extent "How did we arrive here?" It was with these objectives in mind that the key topics were identified and refined for investigation through the interview protocol, and it was also the basis on which interviewees were selected given their vast experience. Following the first round of interviews, a further meeting was arranged to which the interviewees and several additional stakeholders were invited. In doing so, it was possible to test the tentative conclusions of this paper and to start our thinking about next steps.

With regard to economic thought and actuarial practice, the core question "Where are we today?" has two aspects to it. Firstly, "Where is economic thought today?" and secondly, "Where are actuaries in terms of their understanding and application of economic thought?" Answering the first question, if that is at all possible, is of course a challenge for society more generally, but I would venture to say that economics is not where it should be in terms of public expectations, though it is a more reflective and critical discipline than many would first assume.¹⁸

Moreover, while it is clear that there is a prevailing orthodoxy that has dominated since the 1950s, and this remains to the fore of scholarly research and governmental policy, there are noticeable shifts. Developments such as the use of behavioural economics in policy, e.g. the Behavioural Insights Team (colloquially known as the Nudge Unit), and for behavioural economics itself, e.g. Richard Thaler (2017) suggest that this status quo is shifting, and that economics has something more tangible to offer.¹⁹

The answer to the second question is that actuaries are potentially passive recipients of economic thought rather than proactive and challenging of the economics that impacts on actuarial practice. Such an answer may be provocative, but it is an important observation, as

¹⁸ See Hayek's Nobel acceptance speech, *The Pretence of Knowledge*, as a classic example.

¹⁹ Herbert Simon won the Nobel Prize in 1978 for his work on behavioural aspects such as bounded rationality, which is an area of behavioural economics; however, he was actually a political scientist and was the first non-economist by training to win the prize. While Kahneman, who won the prize in 2002 for prospect theory among other things, was a psychologist. So, to avoid getting into debates about economists versus non-economists winning the prize, I have elected to name Richard Thaler, as he was both an economist and a recipient of the prize.

the actuarial profession does not operate in isolation from the development of economic thought.

There are some enduring actuarial principles or, perhaps more accurately, rules of thumb that are taught for the purposes of managing long-term financial institutions, such as the need to use assets that are appropriate both in type and term for the nature of the liabilities. It is evident from the interview discussions that over time there has been a greater emphasis and reliance on the market value of assets. This can also be seen in prudential regulation and financial reporting, which impacts and interacts with actuarial work as it emphasises 'market consistency'. However, there is a trade-off here that needs to be acknowledged. A complex financial situation when reduced to a single number gives simplicity and, some would argue, consistency. However, what is lost is usefulness. Therefore it may be more appropriate to recognise the multiple dimensions across which risk and uncertainty operate so that in mitigating one risk, one accepts more of another risk, or in some instances that the action may generate new risks. The consequence of this observation, and something that was borne out in the interviews, is that it is important to keep the regulatory framework under constant review; it should be the servant of society's needs rather than the master. Moreover, the idea that regulation is only needed to correct market failure in instances where free markets with minimal distortions do not work is the wrong approach. Regulation arguably must do more and not only mitigate market failure but also set in place the right incentives for market actors to do the right thing, which should hopefully increase the chance of achieving the desired outcome.

An active engagement with, and challenging of, economics is an interesting, fascinating and productive area of research for the actuarial profession. Moreover, actuaries and the profession are well placed to make substantive contributions to economic debate in a way that is not common in other spheres outside of economics. Even if actuaries and the profession were simply to challenge other experts, the response to the profession would have to be considered, as much of the mystique of economics would simply not hold any sway. It is ultimately up to the profession to decide how to take its engagement with economics and economic thought forward, but a combination of volunteer engagement within the profession, wider engagement outside the profession, commissioned research, and formal sessional meetings offers many possible options.

The biggest challenge is that for all the abstraction of actuarial work as being calculative, there are underlying fundamentals that are economic. Still germane today is a "Memorandum regarding pitfalls of pension promises" written by Warren Buffett in 1975 for directors of the Washington Post Company and republished in the Berkshire Hathaway Annual Report for 2013.²⁰

So, before plans are introduced or amended, the financial consequences (particularly in a world of significant inflation which I believe to be close to certainty) should be clearly understood by you. Consulting actuaries are very good at making calculations. They are frequently terrible at making the assumptions upon which the calculations are based. In fact, they well may be peculiarly ill-equipped to make the most important assumptions if the world is one of economic discontinuities. They are trained to be conventional. Their self-interest in obtaining and retaining business would be ill-served if they were to become more than mildly

²⁰ <http://www.berkshirehathaway.com/2013ar/2013ar.pdf>

unconventional. And being conventional on the crucial assumptions basically means accepting historical experience adjusted by a moderate nudge from current events. This works fine in forecasting such factors as mortality and morbidity, works reasonably well on items such as employee turnover, and can be a disaster in estimating the two most important elements of the pension cost equation, which are fund earnings and salary escalation.

This is the challenge of estimating and managing long-term liabilities in a world of economic discontinuities. I can think of no other group that would be able to meet this challenge.

Below are my final thoughts on areas where the profession may wish to consider engaging more proactively with economics in order to help further the profession in its role of stewarding long-term financial institutions. These could also raise the bar for public discourse in economics, which is fundamental to everyone in society but which few people can genuinely influence:

- 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.
- 3) The profession needs to articulate what it needs from economics as a discipline. There are lots of approaches to economics and there is a tool kit that exists but is not utilised properly. 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?”
- 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.
- 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.

- 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.

Finally, the greatest challenge, and this is also present in the quote from Warren Buffet, is that everything is inherently uncertain, and it is the ability to accept this and respond appropriately that is likely to be the differentiator between success and failure in the long-run.

"It is not what we know, but what we do not know which we must always address, to avoid major failures, catastrophes and panics."

Richard Feynman

Dr Iain Clacher, University of Leeds, May 2019.

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7 Appendix: Semi-structured interview protocol

A) Control Questions

1. Name
2. Organisation
3. Practice area(s)
4. Current role
5. Qualifications:
 - a. Are you a qualified actuary and if so, how long have you been qualified?
 - b. If you are not a qualified actuary, how would you best describe your background/ qualifications and how long have you been involved in pensions/ insurance/ actuarial practice?
 - c. How many years have you been interested in the use of economic assumptions by actuaries as part of your own role?

B) Interactions with economics day-to-day

1. When it comes to economics, what economic issues, topics, or ideas, whether explicitly or implicitly, impact your job day-to-day?
 - a. If they say everything/many things, they will be asked to name and rank the five most important e.g. inflation, interest rates, equity markets, currencies, etc.
2. Have you ever used anything that comes from an Economic Scenario Generator (ESG) as the basis for advice and/or decision-making e.g. reserving?
 - a. If they say no, will be asked if they use any sort of long-term projection models and what they are advising on e.g. to derive a discount rate based around future asset performance such as equities.
3. For ESGs/long-term projections, are you aware of any of the underlying economic assumptions?
 - a. If yes, what e.g. expected returns, volatility, time horizons, correlations, any reversion model, floors or ceilings?
 - b. If no, what do you think is in there?
 - c. Is it important to know what is in there?
4. In looking at the underlying assumptions of ESGs/long-term projections, how credible do you think the assumptions are?
 - a. What do you understand by 'risk-neutral' assumptions in these models? When are the assumptions applied, and is this appropriate in all circumstances? How relevant is this for the area in which you work?
 - b. Do you think actuaries understand the limits of these models for decision-making?
 - c. How often do you think extreme market movements are seriously considered by actuaries in day-to-day advice? Is this the tyranny of 'on average'?
 - d. How often do you think extreme economic shifts are seriously considered by actuaries in day-to-day advice? Is this the tyranny of 'on average'?

- e. What do you think about behavioural economics and what impact does this have on models built on rational expectations?
5. As the economy evolves, are ESGs/long-term projections ever adjusted to take account of real-world events?
 - a. How does this happen?
 - b. What is the underlying basis for this in economics? Is it science or pragmatism? What is the balance between science and pragmatism?
 6. How difficult is it to challenge the economics that underpins any modelling or projections and are there situations where it is more necessary/appropriate to challenge the underlying assumptions?
 7. Outside of projections, or ESGs etc. where else do you see economics influencing actuarial work e.g. the heavy reliance on market values for deterministic valuations?

C) Open questions: Views on how economics interacts with actuarial practice

1. How do you think economic risk and uncertainty is conceptualised/viewed in practice?
2. What are the long-run economic risks in a long-term liability?
 - a. In looking at long-run economic risks, how much of this is genuine risk and how much is related to measurement problems, for example 'gilts-based valuation'?
 - b. Do financial markets provide sufficient or relevant information to assess the long-term risk in meeting long-term liabilities?
 - c. For long-term liabilities, if you could eliminate or ignore the short-term volatility of the market value based balance sheet, how would the focus on economic risks change for the insurer/sponsor and for the policyholder/pension scheme member? In this situation, what would be the major economic risks or uncertainties from each perspective (insurer/sponsor & policyholder/member)?
3. How is uncertainty incorporated into what you do both mechanically and conceptually?
4. Have you, or your colleagues, ever gone back to first principles and questioned what you are assuming vis-à-vis economics or the underlying paradigm that is being assumed?
5. How much variation do you think exists in economic thought/assumption across different parts of the UK actuarial profession, and different consulting firms? How different is the house view of WTW to Aon or L&G to Aviva on long-term economic assumptions such as inflation or interest rates?
6. Do you think that the approach to valuation, present or past, has had any unintended consequences e.g.
 - a. Contributed to herd mentality
 - b. Has contributed to market stability, instability, or excessive risk taking (ask for examples of each)
 - c. Has influenced the focus of risk management—for better and/or for worse.

D) Governance: Who is responsible for thinking about economics for actuaries?

1. In your organisation, who is responsible for thinking about economics and what is 'state of the art' in economic thought?

- a. Do you know what school of thought they belong to e.g. Keynesian?
 - b. Do you think the school of thought matters?
 - c. What proportion of actuaries do you believe think about the economics of what is going on in the area in which you work?
2. Do you think economic thought for actuaries is developed by the Institute & Faculty of Actuaries (IFoA) or that the IFoA has provided thought leadership on this issue?
- a. Is this something the profession should do more of?
 - b. When you sat your actuarial exams, what economic theories were you taught?
3. Who do you see as having leadership in this area?
- a. Within the IFoA? (What school of thought would you say they fit in)?
 - b. Outside of the IFoA? (What school would you say they fit in)?

E) Next steps: Consequences and debates

1. Thinking about the way in which economic thought is applied in actuarial practice, and taught to actuaries; what consequences do you think that application/teaching has had on pensions and/or insurance?
2. How do you think the profession has done engaging in debates with regard to key issues such as the cost/benefit of financial economics?
3. Do you think that pensions, general insurance, and life insurance are long-term businesses?
 - a. If yes, why?
 - b. If no, why?
 - c. Do you think this is changing or likely to change in the future?
4. What do you see as the pensions/insurance industry's role in managing risk and/or uncertainty, and how has this changed over your career?
5. Are pensions and insurance now too risk averse/conservative, about right, or too aggressive in their investment strategies?
 - a. Does this matter?
 - b. How is this similar or different for insurer capital vs assets backing fixed liabilities vs unit-linked assets? Where it is similar, why? Where it is different, why?
6. To conclude, do you have any further thoughts about areas that we should be investigating further, or economics topics on which you would like to know what is being done throughout the profession?



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