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Self-selection and risk sharing in a modern world of lifelong annuities

Abstract of the London Discussion

[Institute and Faculty of Actuaries, Sessional Research Event, London, 14 May 2018]

This abstract relates to the following paper: Gerrard, R., Hiabu, M., Kyriakou, I. and Nielsen, J. P. (2018) Self-selection and risk sharing in a modern world of life-long annuities. *British Actuarial Journal*. Cambridge University Press, 23. doi: 10.1017/S135732171800020X.

The Chairman (**Mr G. Spivak, F.I.A.**): I am here as a representative of the research sub-committee of the investment part of the profession. I also represent investment actuaries on the Research and Thought Leadership Board (RTLB), which supports tonight's presentation.

The Actuarial Research Centre (ARC) was launched in 2012 as a joint project between the Institute and Faculty of Actuaries, and in partnership with the Scottish Financial Risk Academy. Today the ARC is a global network that delivers industry relevant, cutting edge research programmes, that address some of the significant challenges in actuarial science for the actuarial profession, academic community, and industry. The ARC's current research programme involves partnerships with institutions and organisations in Europe and North America. The actuarial profession is committed to further developing the ARC's internationally relevant programme of research to maximise the impact and benefits that ARC research will bring to the actuarial community globally.

One of the research projects sponsored by ARC in the last few years is "Minimising Longevity and Investment Risk while Optimising Future Pension Plans." It is about replacing the current defined benefit (DB) or defined contribution (DC) pension schemes with something else, which pools longevity and looks at the investment income in retirement, as opposed to just the accumulation phase, or full guarantees provided by the employer.

The multi-disciplinary team behind today's paper is led by Professor Jens Perch Nielsen, from Cass Business School, where the funding from the actuarial profession also supports two PhD students in actuarial science.

Professor Jens Perch Nielsen is the joint principal investigator for this ARC Research Program and professor of Actuarial Science at Cass Business School, London, with a PhD in Statistics from the University of Berkeley. He is a fully qualified actuary from Copenhagen, an associate member of the UK Actuarial Profession, and has 20 years of experience in the insurance and pensions industry. For 6 years, he worked as a consultant and entrepreneur before joining Cass Business School as a full-time professor in 2012. He is a co-author of more than 100 scientific papers in reviewed journals of actuarial science, economics, econometrics, operational research, and statistics and has also co-authored a book on quantitative operational risk modelling.

Professor J. P. Nielsen: I have worked with pensions all my professional life. My focus has always been transparency, trying to have a short and easy conversation with the customer. With the things we are seeing today, start-ups, the Internet of Things, automisation and so on, maybe this is the time to make progress.

In the modern era, you can design and speak directly with the customer, without too many steps in between. What you will see today is, I believe, a first on this topic. It is a 3-minute conversation with a customer, on his mobile phone, while he is on the bus or the underground. After that 3-minute conversation with the customer, he has taken a full and clear decision about his risk preferences. We can back-calculate his investment strategy until we have another conversation with him, perhaps, where he changes something that makes us change his investment strategies. So, we are not asking the customer whether he wants risky investments or not, we are not asking him if he is afraid to cross the street when there is a red light, but we are asking him exactly about his pension. And, once he has answered, everything is set.

Everything can be recorded and audited, so there is no problem from a lawyer's point of view on financial advice. Recently, I wanted to extend my mortgage. I had an interest rate of 2.17%, and I was going to have exactly the same mortgage, but lowering to 2.09% for the next 2 years. I went through a financial advice session for 2 hours to decide whether I could afford my interest rate to be reduced from 2.17% to 2.09%. I was asked all kinds of questions, and it was quite clear that my bank advisor was really bored, more bored than I was, because at least for me it was funny to hear those questions for the first time. It was not funny for him. There is something wrong when you sit for 2 hours, talking about something like that. There is a chance that it is not being done to help the customer, but to protect the adviser. Clearly, if it should be a real interaction with the customer, it has to go much faster.

It is not a classical DCs scheme we are presenting today. It is not a DBs scheme. However, it is a DC scheme with many features of the DBs schemes.

We also provide a new methodology for pooling mortality risk. A modern day Tontine scheme. And we provide a similar arrangement for pooling the investment risk of guarantees.

The first piece of work was to publish Merton's approach (2014, Harvard Business Review) in a formal way. This has already been done and appeared in Astin Bulletin earlier this year. Merton is a great professor, but he is not an actuary. Merton's suggestion of having an upper and a lower bound is probably not the full answer. It is the answer if you are saving for a lump sum and it is the answer if you are saving to buy an annuity when you are 65. However, there is no particular date when you can have no upper and lower bound in our universe. There is no decumulation phase. There is no savings phase, in some sense. You have to see it all as one, as you have this period of 60 years at your disposal to save and spend. We do not divide a pension savers pension arrangement into a savings period, and a draw-down period.

What we are going for is: transparency; easy communication; back-track of financial advice; and acting quickly. We want to do more than Merton. We started with his vision, but we are more ambitious.

This research is about three innovations: a very quick back calculation of investment strategy, from a 3-minute conversation with a customer; pooling of mortality risk; and pooling of the investment risk.

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These are three important innovations. Anyone of them would be worth a research project as each of them is a key issue today. It is just very hard to solve one of them single-handedly, because they are all tied together. It is easier to solve the whole thing at once, and this is what we are trying to do.

Imagine a customer called Emma. She is 35 years old. She might have inherited some money. She has £300,000. She wants to invest it. She is thinking of retiring when she is 65. What do we do? How do we have the conversation with Emma? The actuaries behind the product that Emma is eventually going to buy have to handle mortality risks, inflation risks, and investment risks. However, Emma should not be bothered by any of those things. She does not understand it anyway. Why should we bother her with that?

Merton likens it to buying a car. The questions he wants answering are: Does it drive fast? Can I get it in red? Do you have one ready for Thursday? If they start explaining about what is inside the motor of that car, most of us would be lost. So, when you are talking to a seller of cars, you have simpler things to talk about. Fortunately, when you get into the car you do not need to understand the details of the motor to take the wheel and drive.

Merton is saying it should be the same with pensions. It is not Emma's job to understand all details of constructing pensions products.

What should she understand? She should have a few comments, a few sentences, that would design everything about her pension. Then she should make a quick decision.

So, she states her age now, how much money she has and the age when she needs her pension. This is the 3-minute conversation. She also chooses the number of years she wants a guarantee. That is the only thing she should pick.

Then she should understand what that means. We have constructed one very simple example of this, where the amount she will be receiving in her pension is the most likely amount. It is her most likely lifelong pension, but it is only guaranteed for the number of years she picks. There is a 50–50 chance she is going to receive it for life. There is a 50–50 chance there are going to be some cuts in her pension when the guarantee period is over. All amounts are in real terms, because we believe that that is what customer understands. So, these are the instructions. This is the conversation. Then she gets to choose.

So, this is the graph (Figure 1) for Emma. You can see the shorter the guarantee she picks, the higher the lifelong pension becomes. There can be quite a substantial gain. She can get more than £3,000 a month if she does not want any guarantee at all. Remember, it is her most likely pension. Most likely she will get it all her life. If she wants a lifelong guarantee then she gets £1,400.

So, that is the trade-off. There is always a trade-off. If you want a guarantee you lose the upside. In this case, she can pick her pension for the rest of her life, but she can also pick how many years it is guaranteed. Here she picks 10 years. She is still receiving £2,500, and does not want as little as £1,400 to have the full-life guarantee. For most people the full-life guarantee is not the right choice – it is not their risk preference.

Some comments around this point. Emma picked a 10-year period. She can do that because she understands it. Traditional DBs are often like the one I have. Academics have recently been on strike
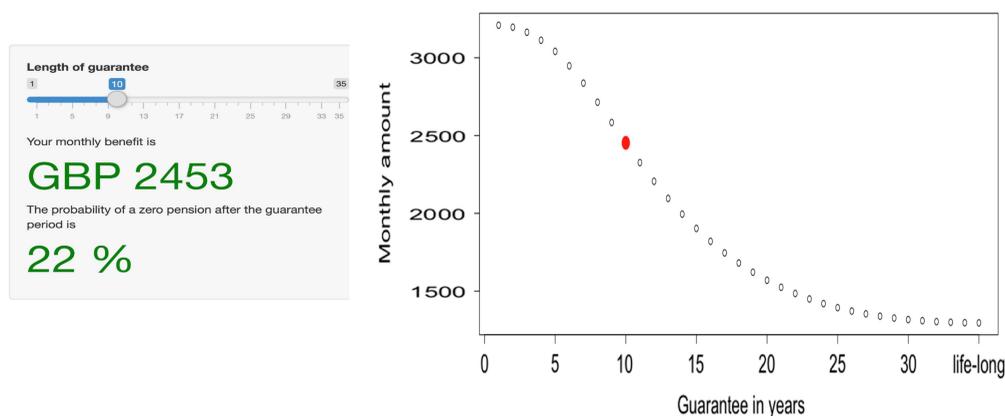
Figure 1. The risk-return trade-off

because there are all kinds of calculations about us losing money. I happen to be one of the academics who does not fully agree with the strike because I am being forced to have a guarantee the rest of my life; being forced into something I do not need. So a lengthy guarantee of 40 years is forced upon me, and, of course, it comes with a loss. We did some calculations. It could be a risk-adjusted loss of around 20% for someone like me.

So, maybe it is not so wrong to go into DCs after all, if that entails more flexibility, that is, more economic value for the customers, because we get what we want, rather than "one size fits all."

There are many, many, advisors who are giving people, who did not realise what they were receiving, too much risk. If you do that, the loss is up to 80% of your pension in risk-adjusted economic equivalence value, as we discussed in last year's IFoA webinar by the same authors as the authors of this paper.

Now we are going into the point about flexibility. It is not that this is the one and only choice you have. You can design flexibility in a million ways. You could create a product for every single payment that is coming in. You could have a pension for the first 10 years and start another one when you are 85. When I am talking to my team members about this work, I talk about what we present today as a Lego piece from which you can build a pension. You can have many different Lego pieces to build your optimal pension.

I will now compare it with a traditional DC scheme. I will try to highlight some of the differences. In a traditional DC scheme, it is unclear what the investment risks are. Pension savers do not understand the investment risk.

They do not understand the mortality risk either. It seems like longevity risk is thrown upon them. In general, it is just unclear what is going to happen in the future. That is the problem with DC schemes.

However, if you look at the proposed scheme presented in today's paper, it is clearly stated how long it is guaranteed, and when it is not guaranteed. Everything is addressed in real terms, making financial planning easy. In a traditional DC scheme, the final pension is hard to predict. In our

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proposed scheme, it is possible to combine it with financial planning, because it is clear what is going on.

So the focus of our new approach to pensions products is on communication and financial planning. Traditional DC schemes have unclear communication, unclear financial advice and unclear legal rights. There is a risk of you making a bad decision because after 2 hours of financial advice you do not actually know what you are talking about any longer. In our proposal, you have clear communication and the saver is able to pick exactly what he needs. The saver takes an informed decision and the saver is able to plan for the long run.

When this paper was reviewed for the *British Actuarial Journal,* there was at least one of the referees who said, "There is a lot of maths there, and it is hard to understand it, and it is really technical." Two thirds of the paper is maths, however, our approach is novel and we found it necessary to document mathematically what we were doing, to document that it really can be done. It does not mean that one needs to read those two thirds of the paper to get to grips with what this is all about.

The customer reveals his or her own risk appetite. Every single pension saver obtains his or her own product. It fits our current individualism. There could be a loss of 20–80% of disregarding individualism in financial planning of pension products as was shown in last year's IFoA webinar. The annuity principle that I have talked so much about, of the Tontine scheme of mortality sharing, was published last year, also as part of this research, in the Geneva papers, together with Bräutigam from Switzerland and Monserrat Guillen from Barcelona. So, that principle is documented in a paper and we have brought it into this paper.

The idea is a simple one. Every day we know how much money everyone is bringing to the table. It is the annuity you have at risk, times your probability of dying. That is the money you are throwing in. Then you get money back, according to what you threw in. So, it is a simple calculation really. You put your own money at risk, and you get the equivalent amount into your account, as long as you live.

However, you can leave the scheme any day. You are not locked in any way. That is the annuity principle. It was published in the Geneva papers, where we did some comparison with Tontine schemes.

We believe in the simple principle that we have in Figure 2.

It looks a little bit complicated, but it is not. It is the simplest possible hedging you have ever seen. You have a most likely pension, and a guarantee, but it can be transferred into a top and a bottom amount. The top is the most likely, where you take all the risks, the bottom is where you only receive the guarantee. So it is actually pretty close to the top and bottom bounds about which Merton was talking.

Now, we used a utility function that is not often used. We changed from the power utility function everyone is using in financial literature, to the exponential. Why did we do that? Everything became so simple that I can actually articulate right now, in a few sentences, what the underlying financial investment strategy looks like. It is just the probability of being between the bounds – that is the hedging. You create your econometric model, you project it into the future, calculate the probability of being in between the bounds, and the output is how much you invest in stocks.

Invest the following amount into the risky asset:

$$\underbrace{300{,}000\,e^{rt+\int_0^t \lambda_i(s)\,ds}}_{\text{value of £300,000 at } t}$$

$$\times\, \mathbb{P}\left(0 \le \underbrace{X_i^*(T_i) + \mathcal{P}_i(0) - 300{,}000\,(\mu - r)\,T_i}_{\text{terminal wealth of unconstr. strategy corrected by drift}} \le G_{U_i}(T_i)\,|\,X_i^*(t) \right)$$

- μ is the average mean return on the risky asset
- r the average inflation per year,
- t the time passed since commencement,
- T_i time from commencement until end of guarantee period,
- λ_i the force of mortality of individual i,
- X_i^* wealth of i following optimal unconstrained strategy
- $\mathcal{P}_i(0)$ the initial price of the hedge,
- $G_{U_i}(T_i)$ the actuarially fair price at T_i for a life-long annuity

Figure 2. The financial hedging strategy based on exponential utility

If you have an infinite top bound and a zero bottom, then the exponential will give you a constant amount to be invested every year in stocks. According to the Law of Large Numbers, this approach must be the least risky approach if you can afford to take the down-side risk. Every year you invest the same amount in stocks; when you are young, when you are old, when you are decumulating, when you are not, because it gives the smallest standard deviation in the long-run.

There can be some problems with the bottom of course, and that is why we have a bottom here and a guarantee. In principle, the exponential utility function gives you a very easy answer to a complicated problem.

That is intuitive to most of us, you should put the same amount in stocks every year, because that is the way you get the most out of the 60 years at your disposal when you are saving and decumulating. However, we changed it a little bit, including a lower bound, and, by the way, also an upper bound, where you do not need anymore. So, you can sell some of your upside to get rid of some of your downside.

Within the area of decisions, the exponential utility function is identical to the power utility function. There is no difference in practice. The difference between these two utility areas is only in areas where people would not like to be invested anyway. So, there is no difference from a practical point of view between using a power or an exponential utility function. There is no difference for someone taking a pension decision, but there is a huge difference in implementation, transparency, and intuition.

Now you know the entire investment strategy, back-calculated from the 3-minute conversation. Also, we want to minimise costs. We want to minimise the cost of intermediaries finding counter-parties for our pension money. It is too expensive.

So, what we do instead, we distribute investment risk among the pension savers such that we to the largest possible extend avoid intermediaries.

This arrangement is free, it is automatic, there are almost no counter-parties, we expect that we might only need an intermediary at all in less than 0.5% of the portfolios seen over their life-time.

Also, the intermediary is needed when the entire pool of people run out of risk appetite. What does the intermediary have to do? The intermediary has to provide risk appetite. The intermediary does not need to provide a guarantee or anything. He just has to provide risk appetite at market conditions, at critical moments.

So, there could potentially be an intermediary around playing a very small role.

Mr M. G. White, F.I.A.: Obviously lots of questions occur, and one wonders whether one's got the grasp of the entire thing at all. What I think I detect is some fundamental assumptions about how assets perform over the long-term. Are you able to explain that?

The other angle is there could be an interaction between those assumptions and the deal you have with the insurer, or risk provider. Who is going to make sure things do not go too badly one way or the other? Would you be able to explain a bit more about that?

I would like to draw your attention to a recent article in The Actuary magazine that was suggesting that a short to medium return on real assets from now, 10 years plus, could well be negative.

Prof Nielsen: Of course there are assumptions. If you go through the entire description of the grant proposal, what you are suggesting is part of it, i.e. market timing. To incorporate this aspect is one stream in the grant that is being developed. You can call it an investment robot. So there are assumptions in today's presentation, but those assumptions could change, without changing the new ideas and new principles. We can in other words incorporate market timing into our approach, and we are working on it. We have some clever structured regression people from Germany, and Austria, and Switzerland working on this right now. You could call it artificial intelligence, or you could call it machine learning, but I call it structured regression.

Mr I. P. McKeever, F.I.A.: I suppose my question is similar. The problem with investment risk is that it is catastrophic in nature. Inflation risk is catastrophic in nature. Mortality risk can be shared out; that is not really a problem. But with inflation, if you get inflation at 10%, then next year's inflation is probably going to be around 10%, and it is probably going to be 10% the year after. It is not randomly distributed. It does actually move. Investment risk is not quite so bad, but it is pretty catastrophic. Is this allowed for in your modelling? What really concerns me is that you are dealing with risks that are in their nature catastrophic, yet, I cannot go to another competitor and say, "another guy says there's 20% risk of me getting less." Then, take both products and think, well, if one of them gives me less, then the other one will be all right. But it will not work that way.

Prof Nielsen: The answer is similar to the answer to the previous question in some sense, because, yes, it is incorporated, however, it can be improved. It is basically in the econometrics. We do the calculations net of inflation, which gives us a particular risk, of course. There is a genuine risk that inflation can go to double digits, right? However, to incorporate your thinking in our approach, one would have to incorporate market timing, and as mentioned above, this is exactly what we are doing at the moment.

Mr McKeever: And double digit inflation remains, that is my problem.

Prof Nielsen: Yes. So, it is part of an optimum modelling of our new approach to be aware of the issue. Have we the end solution? And we are working on it as mentioned above.

Mr R. M. Hill, F.I.A.: Have you road tested this with any people just to see if there are any behavioural aspects?

Prof Nielsen: Yes. We went to Danica, which is one of the biggest pension providers in Denmark and they did a big study using qualitative psychological techniques. We tested Merton's ideas. It turned out no-one understood the thing Merton said would be the simple thing that everyone should understand.

Mr Hill: I understand that, but people tend to make the wrong choices. If you tell them they will receive more by not taking guarantees, the people who need them the most will not take the guarantees.

Prof Nielsen: Exactly. However, I tested the approach of our current paper presented today on my mother and a few friends of mine, and it seems to be working.

Mr M. R. M. Elsheemy: I will continue on the behavioural question. One of the things about people is that they underestimate how long they are going to live. When you showed the guarantee, the promised guarantee, in your example with 35-year-old Emma, she chose 10 years. So, from 65, 10 years, that is 75, and she might live actually, into her 80s and perhaps longer.

So, continuing the behavioural theme, choice is quite a good thing, so people can choose the guarantee. It may be problematic having only a 3-minute conversation with a person who is not financially aware, who is quite likely to underestimate how long they are going to live, without advising them on what is the best guarantee that suits their lifestyle.

Prof Nielsen: Today, you would talk to Emma for 2 hours. She will leave completely confused. At 35 today, she would have to take the decision, for the long run, which she cannot from a behavioural finance point of view, or any simplified, just human being, point of view.

However, we believe that she can afford to spend another three minutes when she is 36. So, we ask her the same question again when she is 36 and when she is 37. We keep asking her the same question, every year, or maybe more often. "Do you still want this? Do you want something else?"

We believe that it is a better use of energy: to keep going, since you are training your mind and you know more and more. Also, as I mentioned to you, this is just one Lego piece. We would advise her to buy more Lego pieces. You know, filling in the holes in various places.

My own personal preference: I would start with a guarantee to age 90, or higher. Then I would start saving for the rest. There are many ways to build these Lego pieces. This is much more flexible than what you see today. Our suggested conversation with Emma can be much more interactive, and much more timely than what you see today.

Mr Elsheemy: So, does that mean people who know that they are going to die younger, because they have acquired current diseases, will choose guarantees with a shorter time, a kind of, anti-selection against the scheme?

Prof Nielsen: Our assumption here is that we know the real mortality, and it has to be the real mortality that is entering these calculations.

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Mr S. D. Hicks, F.I.A.: This sounds a bit like collective DC that has been going for a little while in the Netherlands, although with some variations. One of the problems, as you have just identified, is that people need guarantees later in life, rather than earlier. So, 65–75 is possibly the age range where drawdown might be more suitable in the UK if people can understand what they are doing, or have been advised, with an annuity type product, with guarantees being provided later. Some of the other problems from the theory that you have outlined are: what is the attitude of the Pensions Regulator? How is it going to treat this approach? How is the Department of Work and Pensions going to consider it, if indeed it becomes a product that is available on the market in the UK. Indeed, how is the Financial Conduct Authority (FCA) going to look at it, if it is an insurance product? How is it going to be sold, because I suspect the FCA will be wary of 3-minute conversations being adequate for advice to be given?

Prof Nielsen: I am far more optimistic than you, and I have spent quite a lot of my life with the supervisory authorities. They would love transparency. They would love a transaction that is documented and clear. I see no problem obtaining approval from the supervisory authorities.

Mr Hicks: One reason why customers do not like annuities is because, if they die soon, effectively the money is shared between the other people, and they perceive their money as having been taken from them. Of course, that is still the case with your product.

Prof Nielsen: Yes, I am not solving that one.

Mr A. Smith: I would like to ask a question about the Merton model and how that relates particularly to the lender of last resort that you mentioned who might be paid a small amount of money to chip in if everything goes horribly wrong.

It seems to me there are some elegant bits of modelling here; some really useful insights into how you could ask simple questions and use that to infer what might be a good strategy. You are using a model, which, as I understand it, has a constant risk-free rate in excess of inflation – a Merton style model.

On the basis of that, you are saying, "Well, it should be quite easy to find somebody to come along and stand behind all this. They might charge 25 basis points a year, and it is, sort of, lost in the rounding really." The important bit is the risk sharing between different generations of policy holders. If you are the person standing behind it, you might dig a bit deeper, and you might look at other schemes that have relied on simple models of risk sharing.

A well-known life insurer that went pop a while ago, had, perhaps, a naive view of risk sharing, that there would always be somebody else that would come along to provide the capacity. So, maybe this person who is providing the backstop, might say: "Well, in a more complex model, in something that did not have a long-dated risk free rate in the same way, something that had some risk margins in it, maybe the charge for this backstop guarantee, would not actually be 25 basis points, but might be 500 basis points." Then it would kill the whole thing off. Maybe it would start off being 25 basis points, and it would creep up and end up being 200, and then you would have to work out how to share that extra cost equitably between all the different cohorts that are operating in your fund. It seems to me that those realities of complex models, and market prices of guarantees, could fairly soon jeopardise the simplicity of the scheme.

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So, I would like to really understand what you think about the simplifying assumptions in the Merton model about risk-free rates and the extent to which your structure of cross-subsidies between generations really relies on that risk-free rate not moving.

Prof Nielsen: This is where my background differs from Merton's. Merton is educated in finance. They have a great success of having textbook finance models, entering the entire world. I am trained as a statistician, starting with data and going out to the world from there.

I think many stochastic models in finance are far too simple. I do not think the stochastic models should be so simple. In particular, over 60 years, it is much more complicated. If you take the notion of the first two questions, it was exactly about this. That the world out there is difficult. Right now, stocks are likely to give, perhaps, a negative return, maybe zero, or very little. Inflation can jump. There is a catastrophe of investment risk.

I want to be flexible on the econometrics, to be flexible on the models. Do things that, you know, most people might not even understand. Do complicated statistical things, but do it in such a way that the customers can be part of it, while still just answering simple questions. So, yes, I actually do not believe in simplicity in the econometric model. I think the world out there is complicated.

If you satisfy yourself with a value of risk formulation, which I do not like, then we do not need an intermediary. So, that is another option should the intermediary become greedy. We just get rid of him and say: "Do you dare to take the 0.5% risk that this goes wrong?" Most people will say: "Oh, yes, I take the 0.5% risk." The risk of current systems going wrong is a lot more than 0.5%, it is just not articulated.

Mr J. M. Webber, F.I.A.: I have two questions. One is about the model you have outlined, which I shall call the Danish engine room. How does the customer decide whether to go for a pension with a Danish engine room, or a German engine room, or Belgian engine room, or heaven forbid, even possibly a British engine room. Each of the engine rooms can be different and have quite different characteristics in terms of the pensions outcome? Second, I did not really understand your point about transparency. I am approaching retirement, I am probably comfortable taking a very low level of guarantees. I am interested in how the rest of my money is going to be invested, and what risks I am taking with the rest of that money. How exactly will that be transparent to me, and what choices, if any, would I have over how the bulk of my retirement funds are invested?

Prof Nielsen: It is not thought of as Belgian, British, or Danish. Our new approach could work everywhere. And yes, we consider it to be fully transparent when it comes to its communication of investment risk.

Mr Webber: Sorry, I think you misunderstand. My point is that the engine is a technical function. Different providers and different funds might have different engine rooms. How does the customer choose which one to go with?

Prof Nielsen: So, this is where I am being pushy – I am pushing these different engines towards something transparent. They cannot come and say, "It is special for me, because I am so special." They have to make something transparent. If these engines you are talking about are doing the job that we are talking about today then I am fine. But they are not. So, until they come up with a transparent solution within their engine I would push them.

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So, your other question on transparency. Here, it is a DCs scheme. You can go in and read every day how your money is invested. You can take some of it out every day. You know the investment. You can also combine this with your own investment strategy, but that is, of course, more complicated, because then we need to have an econometric model of your own investment.

Mr Webber: Yes, that is very good. Can I ask a supplemental point? Will you, or my investment money, not be used to provide guarantees for other members of the fund?

Prof Nielsen: In this particular set up, the way it is written, if you look at the paper, the only way you can do that, is actually, not to pick the guarantee, because it is provided by the other ones. Otherwise, it is a good question, I will think about that, because there might be other people asking that question. There should be a solution accommodating what you are asking for.

Questionner from the audience: Two things come to mind. We talk about market timing. We talk about judging whether the market is high or low. For most of us that will sound like a snake oil salesman. If lots of people tried to do this, surely it would not work, because the whole idea of market timing, and being brilliant at it, is there have to be people who lose. Another point that occurs to me is about low risk, you want to try and avoid particularly large equity risk, if you think equities are particularly high, but if that means alternatively investing in debt. We have a lot of debt in the world. A lot of people are saying that that might unravel in some nasty way. So, that is a very real scenario we could get. How can we all be resilient, and transparent, and happy about that?

Prof Nielsen: Let us start with the second one. This is a key question, and it is underlying everything we do, including what I am talking about today. So, it is not going to go away. However, it should be in this set up and it should be part of the econometric model. I went to Black Rock for a 1-day seminar and we discussed this approach. I was talking to a lot of different people with alternative investment ideas. We actually came up with quite a lot that should be invested in debt, as part of this, because of the inflation element. Debt has a tendency to go along with inflation in a good way. But, not if it all goes wrong, as you say.

Part of being a good pension provider is to understand what you are saying, and it is also part of a good management of the system I am talking about here. In terms of market timing there is a tendency, if you create credible models of the long term and look at key numbers such as price, earnings, and dividend cover, then every model will currently say that stocks are expensive, as you say.

I do not see it as losers and winners, I just say there is no reason to overdo risky investments in periods – like now – where the risk premium paid in the market is low. It is not stock picking I am talking about, but timing the risk.

The Chairman: If we are talking about developing an econometric market type model, based on long-term assumptions and taking a long-term view, how can we allow customers to take daily surrender values?

Prof Nielsen: It is because it is a fully DC scheme. So, when the hedging changes, when the investment strategy changes, it is changing in a traditional DC way. You are basically changing your exposure going along, so you can surrender every day.

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The Chairman: If you just allow me briefly to recap the discussion after the presentation. There were a couple of questions about long-term investment assumptions and econometric models. I, for one, am going to be really looking forward to the next episode of this saga, where the artificial intelligence robot making the market timing signals is going to be revealed. There were a number of questions about behavioural finance aspects, and whether this model has been tested with the customers. How much do people underestimate how long they are going to live, with the impact on guarantees in later life. There was a question about assumptions behind the Merton model, and whether the mathematics behind this proposal adequately reflects the real guarantee premiums that can be achieved in the markets which are different from Merton model assumptions. Then, how would the customers be able to decide how to make a choice between different providers?

Please join me in thanking the authors in the usual way.