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**Stream 4: Agency and social policy transformation:
bringing actors back in to the research on social policy**

Stream convenors: Dorota Szelewa (University of Bremen) and Michal
Polakowski (Maastricht University)

Universitat de València - ERI POLIBIENESTAR.
Edificio Institutos-Campus de Tarongers. Calle Serpis, 29. 46022. Valencia.
Phone: (+34) 96.162.54.12- C.I.F. Q4618001-D
Email: espanet2011@uv.es

Traute Meyer

Ageing societies and their pension burdens – A critical examination of the accuracy of predictions

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Abstract

In research and policy-making on welfare state change there exists a dominant strand that might be summarised as retrenchment consensus in pensions. It is based on the assumption that citizens of highly industrialised nations are living longer, and that therefore future spending on ageing will have to increase. Pensions systems in many countries were or continue to be structured in a way that will drive up costs to unsustainable levels. The consensus draws on expert projections, which are therefore policy-relevant and have informed retrenchment decisions over recent years that have increased the social risks of many citizens. This paper explores the accuracy of the expert projections that lie at the heart of this consensus. It first looks at the academic literature on projections in general. This shows that where systematic attempts to evaluate long term projections have been made, these have proven their inaccuracy. Caution is therefore widely recommended by those involved. This overview is

Universitat de València - ERI POLIBIENESTAR.
Edificio Institutos-Campus de Tarongers. Calle Serpis, 29. 46022. Valencia.
Phone: (+34) 96.162.54.12– C.I.F. Q4618001-D
Email: espanet2011@uv.es

followed by an evaluation of the use of forecasts of population change by social scientists in general, which tends to be self-assured, and by demographers, which is more reflexive. Those interested in evaluating accuracy conclude that population change has been forecasted with predictable inaccuracy. The paper will discuss the reasons for this, and in its next step it will reflect on the other projections necessary to make forecasts for pension expenses: economic and labour market developments. Like population change, these are impossible to anticipate with accuracy, but are being made to assist political decisions. On this basis, the paper concludes with a discussion of what our knowledge of uncertainty means for pension policy and its analysis.

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Ageing societies and their pension burdens – A critical examination of the accuracy of predictions

The pension retrenchment consensus

“The share of the world’s population aged 65 or older is expected to nearly double between 2008 and 2040, from 7.8% to 14.7%. (...)

...as the proportion of older persons relative to those in their working years increases, social security and pension programs that rely on the taxes of current employees to pay retirees’ benefits (a “pay-as-you-go” scheme) become increasingly unsustainable.”
(Schoeni, Ofstedal 2010: S 5-6)

“In a world of increasing economic integration and head-to-head competition for markets, few countries can avoid to impose upon working people and their enterprises the taxes necessary to sustain long-term living standards for retirees.” (Clark, Munnell et al. 2007: 3)

“All OECD countries have to adjust to the ageing of their populations and re-balance retirement income provision to keep it *adequate* and ensure that the retirement income system is financially *sustainable*. Demographers have been warning us for some time that ageing is looming and that when it strikes populations and workforces will rapidly age. But many governments preferred to ignore the call for reform and cling to the hope of postponing solutions beyond the next election or claiming that rather painless remedies could be found.”

(OECD 2005: 9; OECD italics)

In research on welfare state change there exists a dominant strand that might be summarised as retrenchment consensus in pensions. This is also shared by powerful international institutions such as the OECD, an important player for pension analysis and policy-making. Thus, the quotes illustrate that the retrenchment consensus is shared by many academics as well as policy-makers.

The consensus is based on the assumption that we – citizens of highly industrialised nations - are living longer, and that therefore future spending on ageing – pensions, long-term care, health care – will have to increase. Pensions systems in many countries were or continue to be structured in a way that drives up costs to unsustainable levels. Without significant reforms they will create a burden for the younger generations, especially when the baby-boomers will retire. This belief is often evoked without further explanation, it has become a truth and it has informed pension reforms of recent years in many countries, leading to substantial cuts in state benefits and an increase in poverty risks for many European citizens (e.g. Meyer, Bridgen et al. 2007).

The experts contributing to the knowledge on which this consensus is based are not necessarily those quoted above. They are statisticians, demographers, economists, working for the national and international statistical offices or in universities. Moreover, some might not agree with the way that the findings they produce are being used. Nevertheless, their results have had considerable academic and political influence and it is therefore important to explore critically the empirical base that has informed this consensus.¹

The current paper endeavours to do so. To this end, one strategy would have been to take a closer look at the main experts, their institutional affiliation and political interests, given so many come from official statistical offices. Political aims are most likely to have influenced the reports of OECD, EU or official national statisticians and civil servants and probably less likely to have been relevant for academics. However, at the same time, even the official publications and data on forecasts do not suggest that authors were constrained by political or other expectations at the outset, but that instead they were doing their best to arrive at reliable projections. Therefore, it seemed more appropriate to engage with the substance of this literature in a first step. In other words, this paper is interested not in the embeddedness and possible bias of experts, but in the accuracy of their projections.

¹ This is not to say that retrenchment is driven by the views of experts alone.

It will start by looking in general terms at the academic literature on projections or predictions. This is in fact rather disillusioning: where systematic attempts to evaluate long term projections have been made, these have proven their inaccuracy. Caution is therefore widely recommended by those involved. This overview is followed by an evaluation of the use of forecasts of population change by social scientists in general, which tends to be self-assured, and by demographers, which is more reflexive regarding available data and which therefore echoes the general critique of expert predictions. Those interested in evaluating accuracy come to the conclusion that population change has been forecasted with predictable inaccuracy. The paper will discuss the reasons for this, and in its next step it will reflect on the other projections necessary to make forecasts for pension expenses: economic and labour market developments. Like population change, these are impossible to anticipate with accuracy, but are being made to assist political decisions. On this basis, the paper concludes with a discussion of what our knowledge of uncertainty means for pension policy and its analysis.

The quality of projections in the social sciences

The literature evaluating the accuracy of projections in the social sciences suggests that these should best be treated with caution.

One of the recent significant contributions in this regard is Philip Tetlock's (2005) study on the accuracy of experts in predicting political events and judging best causes of action. The author asked 284 experts to predict the likelihood of events to occur between 1988 and 2003 (p. 44-5), i.e. within the five years following the study; at the same time he used simple and sophisticated statistical probability calculations to find the answers to these questions as well. After the five years had passed, he compared the ca 27,000 human answers and his statistical calculations with the real events. The result was that the predictions based on statistics were much more accurate than those made by human experts or non-experts, they explained on average 49 per cent of the variance; while human experts reached about 20 per cent (p. 53). Among the experts, some were more likely to be wrong than others: an inverse relationship

existed between self-confidence and accuracy of prediction, the more confident an expert was about her or his judgment, the more likely it was to be wrong.

The study would suggest that if we want to know what the future holds we are better off relying on sophisticated formal calculations than on expert advice, and that we should definitely stay away from those who are sure they know what will happen.

However, even though Tetlock's results of statistical methods were much closer to the truth, average explanations of about half the variance are not a secure base for important decisions about the future. Moreover, this study only ventured five years into the future. Considering many predictions go as far as forty to fifty years, some even more, their reliability is much lower still.

The literature on evaluating the possibility of forecasting in the social sciences is sceptical, too. Some argue categorically that it is impossible to predict the future based on past events (Kristof 2006; Tetlock 2005: 27-41). After all, the future is certainly different from the past (Keyfitz 1981: 591). Thus, "trends do exist but they are not laws" (Kristof 2006: 563), they can rapidly change and cannot be predicted. In comparison, the line of reasoning Taleb (2007) has taken rejects predictions only for the contemporary world. Statistical projections are based on past events and rely on a "normal distribution" of observations. However, today this approach is inappropriate, argues Taleb, because contemporary societies are more like "Extremistan", "driven by globalization, hypercompetition, and ...events pressed on by the ...ceaseless advance of information and communications technology..." (Runde 2009: 503). In such a world, extreme outliers are much more common than in "Mediocristan" a more predictable world of the past (Taleb 2007: 36). Thus we cannot use past events as guidance for the future.

The role of projections for pensions research

Projections or predictions are a necessary part of pension research: academics must consider the future when analysing pensions, not least because they need to be able to say what current reforms will mean for citizens when they retire. In order to do so they also need to

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Edificio Institutos-Campus de Tarongers. Calle Serpis, 29. 46022. Valencia.
Phone: (+34) 96.162.54.12– C.I.F. Q4618001-D
Email: espanet2011@uv.es

assume how markets will behave in the long term and they need to have a vision about future risks and future lives. While such task seems daunting, academics have not been shy in taking them on. Social scientists tend to employ projections without discussing much their potential inaccuracy. The situation is different regarding demographers and economists, i.e. those social statisticians who produce the forecasts. While some are as confident regarding forecasts, there is also a group whose aim it is to reflect on their accuracy and to find ways of improving these. The following sections give an overview of the different ways in which projections and predictions about “ageing societies” are used in the social sciences.

Future ageing as undisputed fact

“In terms of the *demographic imperatives*, it is important to remind ourselves that never before have we been such an ‘old’ society (Laslett 1996) and that, alongside increasing life expectancy, ageing is also a progressively gendered experience.” (Bernard and Phillips 2000)

There are many academics who refer to the ageing of societies as fact. Scenarios of the future are presented without disclaimers, caveats or without allowing the possibility of different scenarios. These publications use ageing as a reference point for further argument, they do not evaluate the substance of the concept. The main aim of research lies elsewhere, for example in assessing its impact or in drawing policy conclusions.

The literature varies with regard to the extent to which contributions show figures that demonstrate the ageing of societies at all. Some papers do, engaging with long term projections which reach at least three decades into the future. These may be based on one expected trend only, such as an increasing share of older citizens as a proportion of the population (Bryson 2011), or they may include more than one variable, for example by anticipating not only greater longevity but also fertility decline, and the ageing of the baby boomers as a specific cohort (Broer 2001; Currie and Delbosc 2010; Kim and Lee 2008: 225; Wise 2005: 8). Other authors (Kaufman 2010: 228; Mordini, Wright et al. 2009; Motel-Klingebiel, Gordo et al. 2009; Pavolini

and Ranci 2008: 246) refer to “ageing societies” as established fact that does not need to be substantiated through figures at all, as is evident in the following:

“The one area in which there is no disagreement is the increasing demand for health personnel in developed and ageing societies. If this demand cannot be met from local sources, developed countries will have to import the required skills, perhaps to the detriment of countries of origin.” (Skeldon 2009: 8)

Ageing as past trend

Academic literature often refers to ageing societies as a future event, a process which will affect societies in the medium to longer term. However, originally, these projections have been informed by past developments, and especially demographic studies deal with this explicitly. They analyse the age structure of the existing population, and ageing refers to the fact that current median ages of the living populations have risen constantly in developed industrial societies (Sanderson and Scherbov 2007: 30). For example, between 1990 the median age of EU27 citizens has risen from 35 to 41 between 1990 and 2010 (Eurostat 2011: 63) and that because of past events, such as the baby boom of the 1960s

“...the change that we expect over the coming decades is already embedded in the age structure of the current population.” (Lutz and Goldstein 2004: 1)

Ageing as future trend – demographic forecasts

There is an extensive demographic literature on population change, frequently reaching decades into the future. To calculate this, demographers use three main indicators: fertility

rates, mortality rates and migration (Shaw 2007; Keilman 1997: 247). Based on past information on all three and expert views they then project into the future how the population of a given country might develop, and what the proportion of different age groups in relation to each other might be. Demographers are aware of their figures' policy relevance. Eurostat's statisticians, for example, create their figures so they can be included in official statistics and used by policy-makers and the general public (e.g. Eurostat 2011; European Commission 2008: 13). Because of this influence, many demographers are careful to point out that their figures are not predictions, but projections (for example Eurostat 2011: 35). This notwithstanding, a lot of the literature on population change acknowledges the uncertainty of projections as caveat (eg European Commission 2008: 16), but then proceeds to make them with confidence. In the European Union the most important projections, made for policy-makers and used by many academics are created by Eurostat and by the European Commission and its Economic Policy Committee (EPC).

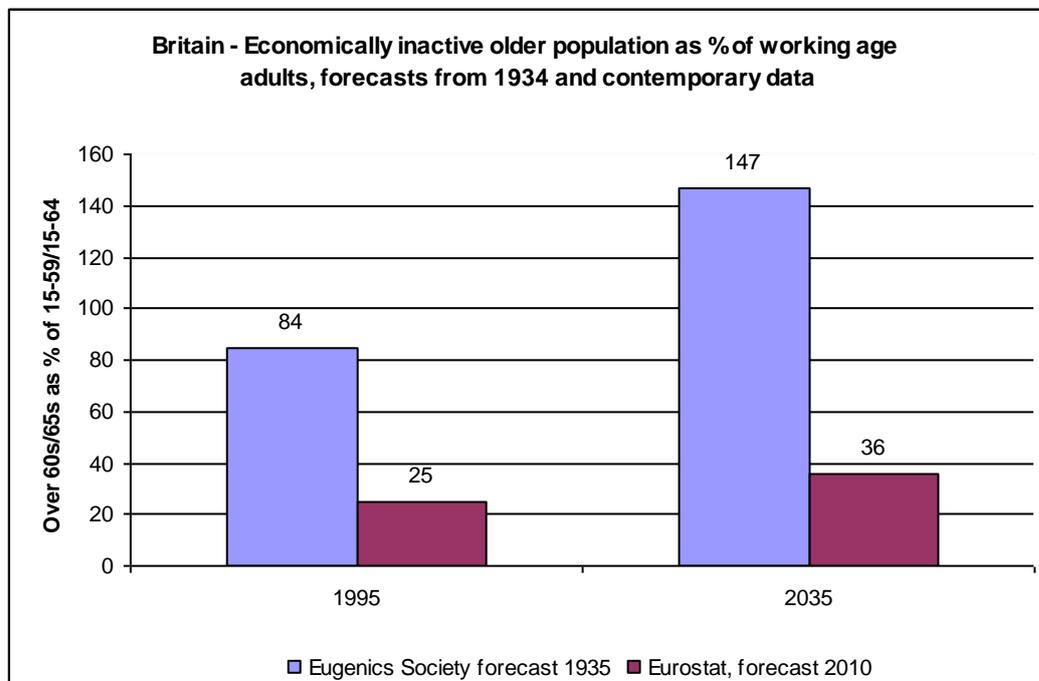
Eurostat's population forecasts are a very important element of the EPC's forecast. They are built on a "conversion scenario" of population change, which takes a very long term view. This assumes that over the next 139 years (until 2150), country differences in fertility, mortality and migration in Europe will disappear. For fertility this means all countries will have converged by 2150 on the level of the countries with the highest current fertility; for life expectancy it is assumed that in those countries with the highest levels currently it will increase more slowly than in those at a lower level; regarding migration it is assumed that there will be no net migration in 2150, but that until then, migration has been calculated using statistical models (European Commission 2008: 58).

Applying this model, Eurostat expects that current trends are moving towards the 2150 endpoint, this means that by 2060 there will be a rise in fertility, in life expectancy, and a fall in net migration into the European Union. Because of these changes, a "dramatic change" in the age structure of the EU is expected, turning the age structure from "pyramids to pillars" (European Commission 2008: 17), which also means that the share of those aged 65 or older of the population of working age (15-64 years) will more than double by 2060, however, the country scenarios are very different.

Demographic forecasts and their critics

The above studies have strongly influenced policy makers and the social sciences. It is therefore important to know how accurate such projections have proven to be. Research on this question will be summarised below, but first, let us start with a retrospective example and compare projections of population development done by the British Eugenics society in 1935 with most recent figures for the UK from Eurostat (figure 1).

Figure 1



The figure shows the projected old age dependency ratio, i.e. the share of the non-economically active older citizens as a proportion of adults, i.e. of those between 15 and 59 (Eugenics Society) and 64 (Eurostat) (for a definition Shaw 2007: 1270); the figures for 1995 refer to real data. Both groups of statisticians agree that societies are ageing, but reality has proven wrong by a large margin the assumptions of the Eugenics Society for 1995; they are 59

percentage points higher than the actual numbers and their projections for 2035 are much higher.

We may consider unreliable drawing on a 76 year old forecast done under very different conditions and based on different expert knowledge from today. While methods and statistical sophistication have certainly changed, the fact that forecasting is far from precise has not, and demography is no exception.

Let us use the European Commission's Ageing report 2009 as a more recent example. Among other things, this compares projections from 2004 with those conducted three years later, in 2009. Even in this short period differences were large. For example, according to the 2009 projections for 2050 the total population of the EU25 will be 8.2% larger than it was projected to be in 2006 (9.4% larger for EU15). Differences varied by country, they were strongest in Cyprus (28.3% larger in 2009), Spain (23.9% larger), Ireland (19.3% larger), Malta (-18.4% smaller) and the UK (16% larger) (European Commission 2008: 52). The greatest divergence was in the group of the young (1-14 years), which in 2009 was projected to be 13.3% bigger in 2050 than forecast in 2006, and those of working age (8.3% bigger), but the group of the over 64s also expanded, as did migration. Projections differed particularly strongly for Cyprus, Spain, Ireland, the UK and Portugal (p. 53-7). As a result of these changes, the old-age dependency ratio also declined, falling from 51.4% forecast for 2060 in 2006 to 50.2% in 2009 (p.23). If divergence of such magnitude occurs in the space of five years, what does this mean for the accuracy of long-term forecasts?

To answer this question it is useful to examine the reasons for such divergence. Indeed, some demographers have chosen as their main aim to do research into the accuracy of their discipline's forecasts (an influential early example Keyfitz 1981). They conclude that they frequently get their projections wrong, and they provide other landmark examples for errors. Among these are that demography did not expect at all the baby boom of the 1960s. After it had happened demographers adjusted their forecasts accordingly, which led to expected birth rates very much higher than actual numbers. This was because demographers did not foresee that fertility would decline again quite sharply in the 1970s. Similarly, demographers have found it very difficult to predict accurately migration figures, because these depend to an important extent on international events and political decisions (Bijak and Wisniowski, 2010; Pijpers 2008). Regarding mortality, the degree of their reduction has often been

underestimated. As a result of such important errors, the profession today is much more aware of forecast insecurity:

“Demographers have become increasingly concerned about the accuracy of their forecasts, in part because the rapid fall in fertility in Western countries in the 1970s came as a surprise. Forecasts made in those years predicted birth rates that were up to 80% too high and too many young children. The rapid reduction in mortality after the Second World War was also not foreseen; life-expectancy forecasts were too low by 1–2 years; and the predicted number of elderly, particularly the oldest people, was far too low.” (Keilman and Pham 2004: 5)

Drawing lessons from such errors, more complex methods to improve the accuracy of predictions have been developed, in particular probabilistic forecasting which produces prediction intervals, i.e. specifies the likelihood of certain trends (e.g. Scherbov, Mamolo et al. 2008; Keilman, Pham et al. 2002). However, at the same time experts agree that learning from the past will not prevent wrong forecasts in the future. Those demographers who evaluated the accuracy of predictions believe that over time they have not become more accurate (Keilman 2008; Shaw 2007: 2; Lutz and Goldstein 2004), because the following obstacles cannot be overcome, no matter how good the method:

Firstly, time series extrapolation can be wrong because the facts that explain past behaviour are often not understood well. This is why the baby boom of the 1960s was not a good guide for trends in the 1970s and 1980s. It was a unique event, not the beginning of a trend, as was wrongly assumed. Secondly, the expert judgment that also contributes to forecasts has proven to be notoriously inaccurate.

“...experts, often being unduly confident, tend to give overoptimistically narrow prediction intervals (Armstrong 1985, quoted by Keilman and Pham 2004: 6).

This is backed up by Tetlock's study summarised earlier, which highlights that human expertise is unreliable, but particularly so for confident experts, who are more often relied on precisely because of this confidence:

“Experts frequently seem unaware of how quickly they reach the point of diminishing marginal returns for knowledge when they try to predict outcomes with large stochastic components...” (Tetlock 2005: 161)

Thirdly, it is difficult to learn from the past because often the basis for past decisions is not sufficiently solid, as the data and the reasons for errors are incompletely documented (Keilman and Pham 2004: 6).

These weaknesses mean that insurmountable difficulties will remain for forecasters. Chris Shaw from the British Office for National Statistics concludes:

“...that it is virtually inevitable that a major projection error in one set of projections will be repeated not just in the next set, but probably in many projections to come.” (2007: 21)

Against this background demographers recommend to consider the uncertainty of forecasts when making policy recommendations (Keilman 2008: 152), and to consider forecasts as too insecure that go beyond 20 years (Keyfitz 1981: 590).

Complexity of pension forecasts

Before reflecting in more detail on the question what the recommendation to take uncertainty seriously means for pension research, we need to consider that population change projections are insufficient if our aim is to assess the future affordability of pension systems. Demography's call for caution refers to old age dependency ratios. However for pensions policy forecasts yet more complex assessments are needed. In order to assess the costs of pension systems for future generations, as is often done in the literature, assumptions about fertility, mortality and migration are insufficient. It is true that on the basis of these we can work out the old-age dependency ratio and that this ratio is often used to measure the "burden" of the ageing population for the younger cohorts. However, such calculations assume, unrealistically, an economic activity rate amongst adults of 100%. In addition, they leave out the question of economic trends. In other words, to project the extent to which future pension costs are a "burden" for the future adult population, it would be appropriate to include assumptions about the relationship between the economically *active* adult population and retirees. Indeed in addition, it would also be suitable to add the proportion of the young, i.e. those 1-15 years old, given they are also dependent on adults. This means that pension forecasts designed to assess future system costs need more variables than used normally by demographers to gauge population ageing: apart from working with the full dependency ratio, not just the old-age one, they need a view on labour market development over coming decades, as well as on economic performance, for example GDP growth, and on market returns of investments. Every of these dimensions in itself is difficult to forecast, as discussed above. If they are brought together, insecurity increases and with it the number of possible scenarios that might be calculated. This is true for the nearer future, but uncertainty increases exponentially when venturing further into the unknown. Anything beyond twenty years is not reliable enough to be policy relevant.

This notwithstanding, more complex calculations of this kind are indeed conducted by EU officials, on behalf of the Directorate General for Economic and Financial Affairs with the aim of advising the council on budgetary reform.² The 2009 Ageing Report is a good example for projections that, at the outset, express an awareness of their insecurity. For example it is stated in the introduction of the document that discusses assumptions that:

² By the Ageing Working Group, consisting of Civil Servants of all national ministries of Finance, and the Economic Policy Committee, also consisting of Member State representatives, with the aim to improve economic and budgetary policies.

http://europa.eu/legislation_summaries/economic_and_monetary_affairs/institutional_and_economic_framework/125055_en.htm

“It should be recalled that the long-term projections are not forecasts, they are subject to increasing uncertainty over time, and the results are strongly influenced by the underlying assumptions. Moreover, given the current juncture characterized by the financial and economic crisis, there is also considerable additional uncertainty concerning the medium-term economic developments.” (European Commission 2008: 15-6)

However, the report then proceeds to produce authoritative claims, even about the long-term future, which seems foreseeable; relatively little space is given to different scenarios (see p. 99-105).

“Even if the number of older people generally increases throughout the projection period up to 2060, it is not the case for every country, and it does not necessarily lead to a monotonic increase in the public pension/GDP ratio throughout the projection period. Despite the differences between Member States, the common trend is clear. As Europe’s population rises it will lead to considerable increases in pension expenditure across the continent with only a few exceptions.”

(European Commission 2009: 84)

It foresees a particular increase in spending in the period 2020-2040, i.e. during a time when insecurity of forecasts grow even more (p. 87).

Conclusion: Implications for future pension cost forecasts

Demographers and social statisticians in universities and official statistical offices such as the OECD, the EU or in nation states are influential agents informing pension research and policy-making. Their calculations and publications have helped to shape the dominant view that pension systems are unaffordable, which has been referred to in academic studies, and used by politicians and administrators when retrenching the mature PAYG-systems of Western Europe, in particular. It is therefore important to ask how accurate they are.

Universitat de València - ERI POLIBIENESTAR.
Edificio Institutos-Campus de Tarongers. Calle Serpis, 29. 46022. Valencia.
Phone: (+34) 96.162.54.12– C.I.F. Q4618001-D
Email: espanet2011@uv.es

As we have seen above, there has been a long-standing debate about the accuracy of predictions in social statistics and demography, as well as a broader academic discussion about this subject, which gathered new momentum in recent years in the wake of the financial crisis as a shock event. Contributions to these debates have been critical in many ways, authors have warned people to be careful with projections in general, and not to rely on long term ones. Such warnings must also be applied to pensions research. Regarding the general debate, we should take note of Taleb's verdict that we live in Extremistan where normal distributions of events cannot be expected. The financial crisis has demonstrated how quickly and unexpectedly labour market and economic projections can be upset by sudden events, and it will have implications for pension expenses not yet known. Likewise Tetlock's insight into the failure of experts to know what will happen in the future should be heeded, considering that experts are needed for projections that cannot simply be repeats of the past. Moreover, the paper has shown that it is very difficult to predict migration; fertility has also been wrongly assessed; the least questionable of the different variants needed for forecasting pension costs is perhaps longevity.

However, pension policy in recent years was characterised by retrenchment in many countries. Using the scepticism that the debate above calls for, should we come to the conclusion that many citizens around the world are likely to be poorer in retirement because policy-makers enacted reforms on the basis of assumptions that cannot be expected to become true? Has retrenchment been unnecessary, in other words? Or at least done for partly the wrong reasons?

Again on the basis of Tetlock's work, we also have reason to be reassured: if we must look into the future then statistical projections of the kind demographers use are the most reliable—they are based on past events and the good ones use sophisticated probabilistic calculations. However, such projections are multi-faceted when focused on ageing alone, and even with those methods a considerable degree of uncertainty remains. In pensions research our task is even more complex because if we want to say something about the affordability of pension systems, we also need to incorporate economic forecasts, adding to the complexity and fallibility of our projections.

As we have seen above, demographers are the first to recognise this, hence they have developed a strand of literature occupied solely with the question of what to do with the

insecurities and how to improve their projections. At the same time, they recognise that this is impossible. We need to embrace uncertainty, and therefore work with variance. We also need to consider carefully national circumstances, the picture might look very different for different countries. Finally, and importantly, we can afford to ignore the long term forecasts. The probability of being right about an event occurring in 30, 50 or even 150 years time, is zero, and thus too low to base policy decisions on it. The European Policy Committee might still prove to be right about their expectations for 2060 in some cases, but the reason would be luck, as Keyfitz put it some time ago:

“Think of a number of marksmen, all equally competent, facing a target that moves about erratically. Some will do better than others, not because of differences in competence, but because they were fortunate enough that the target stood still when they fired, while others had the bad luck to shoot just before the target moved.” (Keyfitz 1981: 581)

Thus, a fair share of what has been said in pensions research about future development must be taken with a large grain of salt, or, more precisely, must be read as one possible variant of the future, out of an indefinite number, and the further forward it reaches, the more hazy it becomes. At the same time, the more short-term projections are indeed more reliable.

Let us finally consider, then, whether it might be appropriate nevertheless to take as guidance the long term warning of ever more demographic change, stripping the welfare state of its resources and sapping the energy out of societies, just because it is better to be prepared for the worst case? If acted on by policy-makers, worst case scenarios, might help to save money, and to dampen people’s long-term expectations. However, in pension research and policy they have contributed to the large retrenchment we have seen in protection systems in recent years (for example Bridgen and Meyer 2007; European Commission 2009: 95). These have reduced public spending, but they have also increased significantly the future poverty risks of the European working population, raising questions of big increases in future dependencies on means-tested benefits and sudden demands for strong benefit increases by future citizens who realise that their pensions are very low. One could therefore also make the argument that projections based on worst case scenarios have helped to form policies that are “...more damaging than the problems they were trying to resolve.” (Bijak 2011: 231)

On the basis of this discussion it is therefore advisable to be discerning of the types of claims about future pension costs. Serious projections should specify their future range, and limit themselves in this regard, the closer to the present date, the better they are likely to be. Moreover, they should offer different scenarios and be explicit about their insecurity. Considering the policy relevance of the studies, experts have a particular responsibility here. Why such care is applied not often enough, and whether and to what extent official statistical institutes in particular are politically biased is an important question, but it would have to be the subject of another paper.

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