# LIVING TO 100 SYMPOSIUM *

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## INCREASED LONGEVITY AND THE CHALLENGE OF DETERMINING $q_x$ AT EXTREME AGES—PART 2

**Presenters:** Adrian Gallop
Ulrich Pasdika
Jürgen Wolff

**FROM THE FLOOR:** I have three questions about the German table. One is, you mentioned you graduated the rates over 99. Did you end the table at 120 or some other factor? The second is, on your trend comparison you said you did not compare it to the United States because, I thought you said, the RP2000 does not have a mortality improvement factor, but, in fact, it does. And third, we've been through quite an economic revolution there during the 1990s with the reunification of Germany. Presumably, I think there was much higher mortality in East Germany and West Germany, and that would seem to me with the economic changes to affect the rising mortality for new purchasers of annuities. Was there any allowance for that?

**MR. PASDIKA:** Regarding your question on the end age of our table, the longest-lived German person, at least a proved case, died shortly before her 113th birthday. So we considered 120 as quite a reasonable and safe approach, and this is where our extrapolation ends. And then we set a rate of one at the age of 121 to facilitate IT implementation.

**MR. WOLFF:** I'll answer the other two questions and start with the last one regarding different mortality in East Germany and West Germany. That's a very good point. You are right, there are significant differences: The mortality rates in East Germany were higher than in West Germany, and after reunification the mortality improvement was higher in East Germany than in West Germany. We were aware of this. Therefore we used only West German mortality data for deriving the population mortality trend. We think this data was not affected by the

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reunification.

Regarding your second question about mortality improvement in U.S. tables, we have limited our trend comparison to tables for individual annuities, for which the mortality improvement is used for the whole future. The U.S. table Annuity 2000 for individual annuities contains mortality improvement just up to the year 2000, but not for later years. The RP2000 is not a table for individual annuities. Therefore we have included neither Annuity 2000 nor RP 2000 in the trend comparison.

**FROM THE FLOOR:** Just for the record, the RP2000 is for pensions. It does have a scale AA improvement factor for all future years. I believe the group annuity mortality tables, GAMs, which are very similar to the pension tables except they have loading, also have a mortality improvement factor. They're very similar to the ones you were showing.

**MR. RICHARD HUMBLE:** I have a couple of questions on the German annuity market. If I understood you rightly, when people get to retirement they have the option to take cash as opposed to being required to take an annuity. Did I understand that correctly? And, if so, I would guess that in the current sort of low-interest-rate environment, annuities would appear relatively unattractive to people who didn't have a good perception of longevity risks. I wondered what proportion of people take annuities.

Second, is there any development in the German market of enhanced annuities providing higher annuity levels to those with demonstrable health problems and reduced life expectancy?

**MR. PASDIKA:** In fact, in most cases there is a cash option at the end of the deferment period so people can choose to take the cash or go for the annuity. It's quite difficult to obtain reliable figures as to how many people go for the annuity and how many take the cash, but I would estimate that at present about 70 to 80 percent take the cash. But, in fact, most annuities in payment originate from immediate annuities rather than from deferred annuities.

Substandard annuities have been introduced by one or two companies in the market, at least as far as I'm aware of, without much success so far. I'm not so sure if in the German market people really appreciate this notion of distinguishing benefit levels by personal health, but perhaps in the future there may be something in it.

**MR. PETER NOWELL:** I have a question on the German paper and one comment. I think regarding the comparison of the U.K. with the German net premium rates: most people use the '92 series at the moment with catch-up on the current improvements in mortality with what was predicted then. Therefore, I think probably the rates should actually produce on that basis; it would be quite similar rather than the way it's shown.

My question is also on the German paper and is, to what extent have you investigated the

cohort effect, seeing that there isn't always one in the German population? I suppose given the shortness of data for insured lives, then it may be just in the population. But I was quite interested in seeing the very low mortality rates around age 65 or so comparing the population with the insured data, because I think because of the lags of the population compared with the insured data in terms of improved longevity, some of that may have to do with not just selection but also with some sort of cohort effect coming through to a different sort of time scale for the population compared with the insured lives.

**MR. WOLFF:** We have analyzed cohort effects for the German population. We have fitted the German population mortality data both with the cohort model and with the traditional model. And we have not observed a very strong cohort effect like in the United Kingdom. According to the paper on cohort effects in different countries that was presented here yesterday, the cohort effect was much stronger in the United Kingdom than in other countries that were looked at in the paper. So there are indications that the cohort effect is especially strong in the United Kingdom.

In Germany our statistical tests have showed we could have used from a statistical viewpoint either the traditional model or the cohort model. And finally, we decided to use the traditional model, because the observed cohort effect was not very strong in Germany and because of problems with determining the cohort mortality trend for the late cohorts, for which the table will also be applied.

Regarding your first comment on the U.K. table, for the comparison of the trends we used just the '92 trend from the United Kingdom without the cohort mortality improvement addition, which was added in 2002. But for the net premium comparison you will see in the paper that we have used the so-called IA92MC, where MC is an abbreviation for medium cohort. So we have used an U.K. table including a cohort effect adjustment for the net premium comparison.

**FROM THE FLOOR:** What I was saying is that I think for the United Kingdom when we make the comparison, we used the catch-up on the table you've used in order to reflect the improvements over and above the expectation that's based on the '92 series. So, in other words, we would adjust the table at the moment and make an ad hoc adjustment in a few years to catch up.

Another comment to make is that when we're looking at the cohort effects in the United Kingdom, when we initially tried to do the work, we couldn't see a cohort effect in the United Kingdom. And it was only the work of Iain Currie and the Government Actuary's Department in using sort of a particular method, which don't impose any sort of rule. But actually the cohort effect sort of jumped out at us after doing that work, so, you know, what you see is what really led us to show how strong the cohort effect really was. I was wondering whether that sort of work has been done on the German data.

**MR. WOLFF:** For the German data we have looked at the population mortality data and fitted the raw data with the method of least squares, both for the current model and for the traditional model. And we couldn't see a very strong cohort effect. I'm not sure if this answers your question, which was partly inaudible for me.

**MR. PASDIKA:** I think we did not do the same thorough investigation into a possible cohort effect in Germany as has been done in the United Kingdom because, as Jürgen mentioned, from the statistical tests that we made, we did not really see a necessity to model it by cohort.

Regarding your question about the difference between an annuitant's mortality and population mortality, it may only be a question of the population catching up with the annuitant's level. This is up to interpretation, but we wanted to be on the safe side. And what is more, at the moment the German government is cutting back in many areas of social insurance, especially in health insurance. Now, the annuitants in Germany still are quite a selected population consisting, for example, of many self-employed, etc., who have better medical insurance. With the reduction in benefits from public health insurance, I would expect that the gap between the population level and the annuitant level would rather increase than decrease in the foreseeable future.

**MS. ANNA RAPPAPORT:** I have two questions for both of you. I'm taking advantage of your being here from Germany and the United Kingdom. The first question is, I know I heard that both of you have some substandard annuity market. What do you see as the outlook, or do you have comments about the future of the substandard annuity market?

The second question relates to public attitudes toward annuities. The Society of Actuaries has been involved and my committee has been involved in trying to understand more about how people feel about lifetime income. We have this anomaly in the United States that people say that they prefer lifetime income, but when it comes to making a choice, they tend to choose lump sums. I'm wondering if you have any insights about public attitudes to annuitization and to what they think lifetime income is in your countries.

**MR. GALLOP:** I'm afraid I'm not an expert on the market for substandard annuities in the United Kingdom. I think that that is an area that is actually growing in the United Kingdom, where you can buy annuities that vary on whether you're a smoker or not a smoker. I think the movement is toward something like providing annuities on preferred lives, on your lifestyle so you can also buy annuities by postal codes, the place where you live, which can vary quite dramatically over the United Kingdom.

**MR. PASDIKA:** I think with regard to Europe that the United Kingdom is actually the most developed market with regard to substandard annuities, as far as I know. One problem with this product concept is, if a considerable part of the substandard risks moves out of the standard annuities, this will affect the standard rates that you have to charge.

Another issue is the underwriting: in the substandard market if you really take heavy substandard risks, if you underestimate the life expectancy by only a couple of months, this may have a significant impact on your profits. Or if you accept a smoker who has decided to give up smoking and buys a substandard annuity priced for a smoker, and then he stops smoking., It is likely that his life expectancy will improve after he has stopped smoking., How do you make sure that smokers do continue smoking?

In regard to the public's acceptance of annuities in Germany, the tax legislation with regard to life insurance has been dramatically changed in the last few years. You can now get the maximum tax advantage only if you buy an annuity. So what the government would like to have is people taking out individual or group annuities to make up for the reduction in the state pension. Most young people don't expect to get much out of the state pension anyway, so there's quite an incentive to buy annuities. But so far those kinds of obligatory annuities that the German government thinks of have not had the acceptance that the government would like them to have.

**FROM THE FLOOR:** This is an observation and a question. I noticed the table you did on the relationship between the amount of annuity and mortality. Of course, there have been a lot of studies that have shown the relationship between various measures of socioeconomic status and mortality. I presume then the table that you developed was targeted at the highest annuity level to make sure it would be adequate at that level. But I was wondering if you had a recommendation to insurers or in general about how to incorporate amount of annuity into the mortality assumption or into the pricing of the annuity.

**MR. WOLFF:** Yes, we have derived mortality by amount, so the death count and the exposure count were weighted with the annuity amount. But I think it's difficult for insurers to incorporate the dependence of mortality on annuity amount into the pricing: If a customer gets less than 10 times the benefits for paying 10 times the premium, he could buy 10 different annuities from 10 different providers. Well, it's difficult to give good advice for the pricing. I think it might be reasonable to derive mortality rates by amount and to use the same pricing mortality rates for all amounts.

**MR. PASDIKA:** An additional comment: if you are aware that actually most of the business comes from the upper end of the annuity amounts, then probably you need an adjustment of the table for that. The question is, if you are at the lower end, is it appropriate to reduce the rates? That's a difficult question.

**FROM THE FLOOR:** I have a question for Jürgen on your paper, which I recognized since I'm involved in similar work in the United Kingdom. This is a question that's different from all the others you've had, I think, but my ears pricked up when you said, I think, that the reserves of German insurance companies increased by 4 billion euros when these tables were released. I

was interested in the mechanism that you used for releasing tables. We had a similar issue in the United Kingdom when we produced the interim adjustment, the 2002 adjustment, to the '92 series And we actually did some work before that table was produced to try and get some feel for the change in reserves, and we thought there would be quite a small change in reserves.

One of the reasons we thought that was that in the United Kingdom we have a regular annual process of looking at mortality and releasing the results to offices so that they can adjust things as they go along. But even so we were worried when we produced those in-trend adjustments that there would be an effect on reserves and life offices.

And, I think, in the event there probably was something, 1 billion euros, perhaps, one-quarter the amount that you produced, and that produced considerable comment. At the time, I have to say, the actuarial profession in the United Kingdom is actually having a difficult time for all sorts of reasons, and now we're going through a discussion about how this information should be released, and by what mechanism it should be released. If you're going to do something that can have an effect on market prices, you're going to have to be very careful. So I just wondered what process you used for producing that information, and what consideration you gave to this problem at the time the information was released.

**MR. WOLFF:** Information about the new tables was released in June 2004 at a meeting of the appointed actuaries in Germany. The first step of reserve strengthening had to be done by the end of 2004. The volume of the first step of reserve strengthening was estimated to about 4 billion euros for the whole German individual annuity market. Reserve strengthening was financed mainly by reducing the profit participation, which in Germany arises mainly from interest profits. Interest profits depend on the issue date because the guaranteed interest rate changed in the past: The guaranteed interest rate is 3.25 percent for a portion of the business, 4 percent for another portion and 2..75 percent for still another portion. Not only the appointed actuaries were informed, also the press was informed at a press conference last June. The companies had then half a year to incorporate it into the systems and to do the financing.

**MR. PASDIKA:** Regarding the release process, the actuarial community was aware that the committee was working on the table. So the market was prepared for change to a certain extent.

Also, when the 1994 table was introduced 10 years ago, there had already been a reserve strengthening. So it was not such a surprise that the successor of the 1994 table also caused a substantial reserve strengthening.

The companies also have to be careful about the transition in new business when a new, more conservative table is released.