



## DISCUSSION PAPER PI-9910/B

Reply to “Survivor Bonds: A comment on  
Blake and Burrows”

David Blake

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The Pensions Institute  
Cass Business School  
City University  
106 Bunhill Row London  
EC1Y 8TZ  
UNITED KINGDOM

<http://www.pensions-institute.org/>

## **REPLY TO "SURVIVOR BONDS: A COMMENT ON BLAKE AND BURROWS"**

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Survivor bonds are bonds whose future coupon payments depend on the percentage of the whole population of retirement age (say 65) on the issue date still alive on the future coupon payment dates. Such bonds, if they were to be issued, would make ideal assets for matching the liabilities of life annuity providers in the presence of mortality risk. Kevin Dowd makes the following comments concerning the proposal made in the above article in the *JRI* for the state to issue survivor bonds:

- He believes the proposal is feasible in principle but recommends that the bonds should be issued by the private sector rather than by the state on the grounds that the mortality risk contained in them can be hedged using, for example, reinsurance, dynamic hedging, or even securitization;
- He believes that the relevant population for determining the coupon payment calculation should be the population of surviving annuitants, rather than the whole population; and
- He proposes extending the concept of a cash survivor bond to cover survivor derivatives.

We did consider whether the private sector would be in a position to issue survivor bonds, but we did not explicitly consider all the key hedging techniques mentioned by Dowd. Although these techniques are the standard ones for laying off risks, they work best when the risks being laid off are specific or idiosyncratic in nature, even if they are also potentially large risks such as the weather. The risks with survivor bonds are aggregate risks of potentially very long duration, and the issuer cannot revise the terms of the extant bond in the light of experience. The issuer can only change the terms of any subsequent bond issued, so any costs of underestimating mortality improvements are shared between the shareholders in the company issuing the survivor bond and the buyers of future survivor bonds. The greater the share of this cost passed on to future survivor bondholders, the less attractive these bonds will be to investors. While future survivor bond purchasers might not themselves experience mortality improvements that are unanticipated, they will nevertheless experience a

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David Blake is with the Pensions Institute, Birkbeck College, University of London. He is grateful for the comments of Richard MacMinn.

mispricing of these privately issued bonds, and this provides another justification for the government to issue the bonds if it does not attempt to pass on the costs of underestimating mortality improvements to future purchasers.

We did consider one hedging technique proposed by Dowd, namely life assurance (or endowment) contracts. These would work reasonably well only if mortality improvements were evenly spread across all ages. However, the mortality improvements over the last 20 years experienced in developed countries have been concentrated in the older age groups, and this uneven improvement in mortality has lowered the effectiveness of this particular hedge. An analogy would be the different effectivenesses of using short-term bonds to hedge long-term bonds when there are parallel and nonparallel shifts in the yield curve.

For these reasons, we felt that it would be more efficient for the state to issue them. Furthermore, nothing can prevent private sector companies from issuing survivor bonds and using the hedging techniques suggested by Dowd, yet no such bonds have been issued in the modern age by private sector issuers anywhere in the world. Dowd argues that pharmaceutical companies and other private sector firms geared toward the elderly market would be natural issuers of survivor bonds. This may be so, but I envisage two problems with this suggestion. The first deals with the depth of these companies' pockets. Is the extent to which such companies' long exposure to mortality improvement risk sufficiently great that they would be willing to issue survivor bonds in sufficient volume to meet the annuity providers' demands to hedge their short exposure to mortality improvement risk? I doubt it. But if I am wrong, why have pharmaceutical companies not already issued survivor bonds? Perhaps it is because of the second problem: pharmaceutical companies tend to be high-risk with large R & D expenditures. Investors would have legitimate concerns that they might not have the cash flows to pay the coupons on the survivor bonds. Issuing sufficient survivor bonds to have any effect would create additional risks with very long tails: such companies would find it hard to persuade investors that the payment of the promised coupons could be credibly made.

At the same time, Dowd points out some weaknesses in our appeal to the Arrow-Lind theorem to justify our proposal that the state should issue survivor bonds: namely, that in the real world, taxes are not costless to collect, households do not bear an equal share of the tax burden, and distributional effects can be significant. These criticisms are, of course, valid and could be the reason that no government in the modern age has issued survivor bonds either. However, an equally likely reason is that the worsening of the demographics is a fairly recent phenomenon and that such bonds have not been thought necessary before.

Similarly, private sector issuers are currently free to issue survivor bonds with any terms of their own choosing, including linking the coupons to the mortality experience of any particular annuitant population rather than of the aggregate population. Again, this has not happened.

The state could also link survivor bond coupons to the annuitant population, but distributional consequences would occur as mentioned in the original article; in particular, a transfer of wealth from the general population to those longer-living and generally richer members of society who voluntarily buy annuities. In every country that sells life annuities, the average life expectancy of those individuals who purchase

life annuities exceeds, in some cases by up to five years, that of the population as a whole. The distributional consequences of the state using the annuitant population as the base cannot be avoided.

In my view, the really interesting contribution of Dowd's comment is the extension of the survivor bond idea to cover survivor derivatives such as survivor options, forwards/futures, and swaps. I can certainly envisage an interesting and important future research agenda addressing design and pricing issues here.

But the prospect of survivor derivatives trading in the real world is likely to remain a pipe dream unless and until survivor bonds themselves are issued and Dowd and I disagree over whether the state or the private sector will be the first issuer. I think the state should kick-start this market. This is what happened with inflation-indexed bonds. In 1981, the British government became the first major government in the developed world to issue inflation-indexed bonds. Almost 20 years later, utilities have begun to issue such bonds. I believe a far-sighted government somewhere needs to adopt the same bold approach with survivor bonds.