

# Institute for Policy Research



## Risks to the individual in Defined Contribution pension schemes

### About this research

The introduction of the quasi-compulsory National Employment Savings Trust (NEST) in 2012 signals a massive change in the UK pension system, involving a move from defined benefits, to a defined contribution scheme. In a defined contribution scheme individuals are responsible for building up their own pension fund to provide an income during retirement.

Research conducted by Professor Ian Tonks at the University of Bath and Dr Edmund Cannon at the University of Bristol, has assessed the likely performance of defined contribution pension schemes, and the associated risks that individuals will face as a consequence. To inform their analysis they used international historical investment returns and wage growth data (1901-2007) to calculate hypothetical retirement incomes in sixteen countries. They conclude that the downside risks to the individual in such schemes are considerable.

## Research findings in context

### 1. Insufficient funds for retirement

The most notable risk that individuals face is that there may be insufficient funds at pension age to provide an adequate retirement income. This risk is measured in two ways.

First, the **pension fund ratio** compares the size of the pension fund the individual has accumulated to their income prior to retirement. The optimal ratio is between 8 and 16, according to the UK's Pensions Commission, in their 2004 report: *Pensions Challenges and Choices*.

Second, in countries with a well-functioning financial market in annuities, where at retirement the accumulated fund can be used to buy an annuity that provides a regular income for life, we can ask how the annuity that is typically available relates to the person's earnings in the years immediately preceding retirement. This is the **replacement rate**. The UK's Pensions Commission recommends a rate of between 50% and 80%.

The authors assess the risks in defined contribution schemes by using international investment returns (stock and bonds returns) and wage growth data for the period 1901 to 2007, to calculate hypothetical retirement incomes based on regular contributions throughout a working life. They pose the counterfactual question: what pension would someone have achieved if they had been able to invest in a defined contribution pension scheme and earned the investment returns which actually occurred over the twentieth century?

They simulate pension fund ratios and replacement rates for sixteen countries. They also consider three alternative investment strategies, as between equities, bonds and a 'lifestyle' mixture of the two, involving a gradual shift from equities to bonds over the period of working life.

### The research found that:

- In all countries pension fund ratios in defined contribution schemes are low.
- The pension fund ratio is particularly low for all-bond investment strategies; slightly improved for 'lifestyle' scheme strategies; and slightly more improved (for most countries), but still below optimal for all-equity strategies.
- The countries with the highest pension fund ratios in defined contribution schemes, given an all-equity investment strategy, are the Anglo-Saxon countries: UK, USA and Australia.

## Key findings

Two main risks face individuals in defined contribution pension schemes:

- There may be insufficient funds to provide an adequate retirement income; and
- Pension fund values are volatile, so that the timing of retirement may significantly affect the adequacy of retirement incomes.

It is those who are on low incomes pre-retirement who are likely to secure the lowest rate of replacement of that income, when they retire. The shift to defined contribution schemes means that poverty in working life is likely to continue into retirement.

- Replacement rates are in general satisfactory, but are everywhere significantly worse for those in the lowest tenth of the income distribution.

### 2. The timing of retirement

The second risk is that pension incomes will be significantly influenced by the timing of retirement. The research shows that in each country, the simulated pension fund ratio is volatile, depending on the state of the financial market. This volatility is however lower for the 'lifestyle' investment strategy, as asset allocation within the pension fund shifts from equities to bonds, as retirement nears.



## Policy relevance and implications

The particular scheme that the UK has adopted (NEST) required all employers to enrol employees into a qualifying pension scheme from October 2012 (though individuals can opt out). This obligation initially affects only large employers, requiring them to pay a minimum of 2% of employees' earnings into the scheme. It will however extend to all employers by 2018, by which time contributions must be at least 8% of earnings.

The change the UK is making to its pension system is part of a wider trend. Around the globe pension systems are moving towards funded defined contribution schemes. Unlike state pension systems or occupational pension systems, in which the taxpayer or the employer respectively bears the risk, in defined contribution schemes the individual builds up their own pension fund and bears the risk of ensuring they have an adequate income in retirement. The important questions for individuals faced with such changes are: how well are these schemes likely to perform and what risks am I likely to bear?

This research suggests that this policy shift poses serious risks for individuals participating in these schemes. The risks relate to the **adequacy** of the individual's accumulated pension fund, for securing an adequate income in retirement; and the way that the timing of retirement impacts on pension income.

The critical question for policy that this research raises is what explicit or implicit guarantees are offered to individuals to offset the risks they face? If in the future defined contribution schemes underperform, so that the accumulated funds are not sufficient to generate an adequate pension in retirement, will individuals be able to fall back on the State to provide a pension?

Last but not least, the research suggests that it is those who are on low incomes while working who will secure the lowest rate of replacement of that already low income, when they retire. The shift to defined contribution schemes will mean that poverty in working life will continue into retirement.

## Methodology

The research examines pension risks using international historical data on stock and bond returns and wage growth over the period 1901-2007, to calculate hypothetical accumulated defined contribution pension wealth in sixteen major economies.

The analysis assumes that an individual saves from age 25 to 65 and is continuously in employment during that time, making annual contributions of ten per cent of labour earnings, into a tax-privileged fund. The rate of return on investments depends upon that country's bond and equity yields and the assumed asset allocation. This allows pension fund ratios to be calculated.

The research also constructs synthetic annuity rates for each country in each year, using the relevant population mortality projections. This allows replacement ratios to be calculated.

## Contact the researchers:

**Professor Ian Tonks**  
School of Management,  
University of Bath  
[I.Tonks@bath.ac.uk](mailto:I.Tonks@bath.ac.uk)  
[www.iantonks.weebly.com](http://www.iantonks.weebly.com)

**Dr Edmund Cannon**  
Department of Economics,  
University of Bristol  
[Edmund.Cannon@bristol.ac.uk](mailto:Edmund.Cannon@bristol.ac.uk)

## More on this research:

Cannon, E. and Tonks, I. (2013) 'The value and risk of Defined Contribution Pension Schemes: International Evidence', *Journal of Risk and Insurance*, 80(1), pp. 95-119

Cannon, E. and Tonks, I. (2012) 'Risks to the Individual in Defined Contribution Pension Schemes', *VoxEU* August 2012.  
<http://www.voxeu.org/person/ian-tonks>



Institute for  
Policy Research



UNIVERSITY OF  
**BATH**