Report on: "Notional Defined Contribution (NDC) pension schemes and income patterns"

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1 Summary

The paper deals with a PAYG pension system that is organized as a notional defined contribution (NDC) model. The authors look at one aspect of these kinds of models that has so far not been analyzed in detail: how replacement rates differ for workers with different income profiles (i.e. with rather steep or rather flat profiles or with missing contribution periods at the beginning or at the end of their careers). They show that replacement rates are higher for workers with flat profiles and that for them an early stretch of missing contribution periods is relatively advantageous (while the opposite is true for workers with steep profiles).

2 Comments

The paper deals with one specific aspect of NDC systems: the interaction of replacement rates with the individual income histories. This is probably a rather small point but I think that it is valuable to have some clear-cut and systematic results on this issue. This is even more so given the fact that so far the academic literature does not contain many research papers on the working and the properties of NDC systems although they are getting increasingly popular in the real world.

I have, however, a number of recommendations that could help to improve the paper and to clarify certain points as I am going to argue in the following.

2.1 Measures of adequacy

The authors start the paper with a discussion of the "adequacy of a stream of pension annuities from the viewpoint of the individual". In particular, they distinguish three

dimension of adequacy to which they also refer in later parts of the paper. To be frank, I had difficulties in understanding the meaning of (some of these) definitions and I also do not see the immediate relevance for the main exercise. The first definition is relating adequacy to the "the pre-retirement standard of living". This is a clear concept. The second dimension refers to "the number of annuities that will (or are expected to) be paid, and hence the (expected) length of the retirement period allowed for by the system". This might be relevant for the individual in order to judge whether the system is "fair" but I would not call this "adequate" (at least not in the sense as this expression is used by the World Bank or the OECD in their pension publications). As the third dimension they consider the "contribution rate whose payment has generated the property right on the stream of pensions and hence the benefit-cost ratio of the participation in a pension system". The contribution rate certainly determines the general level of the pension system, but again it is not clear to me how this fits into an overall assessment of adequacy.

Furthermore, I would have thought that there is also some discussion about other, alternative measures of "adequacy" that are often used by international organizations: the replacement ratio compared to average lifetime income (instead of last income), the first pension level (defined as the value of the first pension in comparison to the current average wage) or the average pension level (over the entire retirement span). The latter concepts are closely related to poverty measures (that are also mostly defined in relation to average income) and are thus particularly important for the question of adequacy. For the average pension level the topic of pension adjustment is important (with the rate of inflation, the growth rate of wages or some other rate that takes the front-loading of the G-factor into account). But these aspects are only mentioned briefly in the paper.

2.2 Example in chapter 2

The basic results of the paper (and the basic intuition) are contained in Table 1. I find this example quite revealing but there are some elements that I do not understand:

- Why aren't the returns on the account balance credited for the last year? I think that in the existing NDC systems such a credit is given?
- How is the weight AB_R calculated? If I use equation (4) one should get (for the case in column (4)) that $\tau_{i/i-x} = 1$ and not 68.9?
- It would be interesting to see the values of other adequacy measures. I have, e.g., calculated the pension level for the same numerical example. It comes out as 70.26%

(for the case with a "normal" income profile), 86.87% (for the steep profile) and 57.56% (for the flat profile). This is not surprising since all start with the same wage and the slow-growing individual have a smaller pension. Nevertheless it indicates that maybe the individuals with the steep profiles are not the ones the policymaker is concerned since they typically have rather high pensions (and thus pension levels). The individuals that are in danger of falling into poverty are the ones with rather flat profiles (and/or many missing contribution periods).

If one calculates the replacement rates not with respect to last periods income but rather to the (unadjusted) lifetime average one gets a value of 105.41% (for the case with a "normal" income profile), 102.39% (for the steep profile) and 108.61% (for the flat profile). The pattern is similar to the one with the replacement rate used in the paper but the magnitudes are much smaller. Which concept is the better one depends on the definition of the accurate standard-of-living etc. but this could deserve some discussion in the paper.

- In order to calculate the average pension level one would need more information about the remaining life expectancy in the example and about the adjustment of pensions.

2.3 Organization of the paper

I regard the example of chapter 2 as the crucial section of the paper. It illustrates the main idea (that individual replacement rates depend on the slope of the individual income profiles). Chapter 3 provides a more thorough look at this result and it shows how the size of the contribution rate, the career length and the notional interest rate affect these main results. In my view chapter 3 could be shortened quite a bit. Maybe it would be reasonable to start with equation (6) (special case of equation (5) when the "conventional rate of return" equals average wage growth) and show the results concerning $\frac{\partial \frac{p}{w_n}}{\partial a}$ and $\frac{\partial \frac{p}{w_n}}{\partial n}$ (for the last partial derivative maybe it would be interesting to look first at the case with $d = e - n$, where e is life expectancy). The general case could then be discussed briefly. I would also skip Figure 1 since in my view it does not provide any "new material" that is not already contained in the example of chapter 2 and in Figure 2.

2.4 Additional short comments

- Is **formula (2)** correct? I think the product should define $\pi_n = 0$ otherwise there is also a credit for the last period.

- There are a good number of **typos** in the paper and the entire paper should again be checked. I just want to list some examples. On p.5, line 1 there is a missing space in "year i" and in the second line after equation (3) there is another missing space in "rates of". On p.11, fifth line from below there is a bracket missing after "(the slope of (5))" etc.

- Sometimes the **use of the language** does not sound optimal to me. For example I would not call the missing contribution periods a "discontinuity". I would rather call it a "career break" (or just "missing contribution periods"). Also at first reading I had difficulties in understanding what is meant by the expression "rates of the pension savings" (p.4 last line before chapter 2).

- Also some of the **notation** is misleading. In equation (3), e.g., the authors use the expressions δ_w and δ_π while in equation (1) they use δ for the "rate of return anticipated and embedded in the annuity divisors". In fact, I would prefer to use an index i in the expression for δ_π since it is different for different individuals with different growth rates α^i. This part of the paper is really confusing since just a few lines later the authors use i for a period and this then also appears in expression (4) for $\tau_{i/i-x}$. I would urge the authors to change the notation in these parts of the paper.

- On p.12 the authors mention that "the system ensure that the (constant) contribution rate will not be perceived as a tax but rather as a compulsory savings rate rewarded with a fair and uniform rate of return". It might be appropriate to **refer to the paper Disney (2004)** who has shown this empirically.

- The **concluding section** of the paper contains some broad reflections on the properties and advantages of NDC systems. Although interesting, these parts of the paper are not really related to the earlier analysis.

To summarize my remarks, I think that the paper studies an interesting aspect of NDC systems. I would, however, consider to shorten the paper (maybe even move it towards a "short paper" or a "note") since the main message of the article is easily conveyed via the numerical example and some straightforward calculations.

References

Disney, R. (2004), 'Are Contributions to Public Pension Programmes a Tax on Employment?', *Economic Policy* **19**(39), 267–311.