

Management and Business Administration

**THESES**

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**Model options for mandatory old-age annuities**

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## I. RESEARCH PRELIMINARIES AND THE REASONING OF THE TOPIC

1. The models of old-age provision have frequently changed during the latest century of the history of humanity. Previously for centuries in a traditional society which can be characterized by huge web of relatives the provision of old-aged didn't appeared as an independent problem – partly because the vast majority of the population didn't have reached the old age and deceased in his/her childhood or during his/her active years. So people on the upper side of the “social ladder” – the same way as in their young age – in their old age lived out of their wealth. The people on the lower side of this ladder – the same way as in their young age – in their old age lived out of the result of their work. The cause of their death was often the inability of the further work. For the few who lived so long that finally were unable to work (and they didn't die into this) the family, the relatives provided living – although in those environment it was hard to define the term “unable to work”, because in the family it was found for everybody something to do what he/she was able to perform.
2. During the twentieth century with the changing of the division of work substantially increased the number of those old-aged, who cannot be employed by neither a workplace required a standardized working ability nor the already disintegrated multi-generational family living in the same geographic location. So the separate problem of old-age provision, the pension-problem has risen. This closely interdependent with the change of the characteristics of the work, with the cease of the locking into a special geographic location (which also interdependent with this), with the (interdependent) torn of the web of relatives, with the end of the traditional social order, with the huge increase of the life span and the wealth and with the (interdependent) substantially lower number of children.
3. It seems, for the time being the society is worldwide far from solving this historically new problem for a long run. It means that we are far from establishing a model, which can be used for generations, similarly to the model was used before the pension problem has appeared. It is possible, that – as The Economist 2009 Pension survey found it – on the long run the pension problem will be solved by returning to the concept of lifetime work. But until this time we would acknowledge that the pension was only a historically ephemeral experiment, at least in that Twentieth century,

universal type we used to and considered as obvious, we have to experiment inside the present “pension-paradigm”. I mean “pension-paradigm” the universal system of old-age pension which was extended to (almost) everybody.

4. Inside this pension-paradigm just now is happening a big shift from DB (defined benefit) schemes into DC (defined contribution) ones. We can call it “DC revolution”. The “traditional”, universal pension schemes originally were DB schemes and they remained mainly DB ones so far. This is true for both main universal pension subsystems: for the PAYG-type state system and the funded occupational pension subsystem. But both subsystems have started to leave behind the DB principle and adopt worldwide the DC one. In Central- and Eastern Europe the “DC revolution” in the state subsystem – so far - meant its partial funding (not counting the sharp change of Hungary in this respect in 2010).
5. The DC systems relentlessly reveals that the source of the pension is not other, but the individual savings or contribution to the maintaining to the pension system during somebody’s active lifetime. It also formulates the requirement, that – in the basis of expected values – the sum of individual contributions and the expected sum of pension have to be equal. As a joint requirement is formulated that the financial burdens of increasing life expectancy have to bear by the persons concerned. The DB systems have a tendency not to count strictly the source of the pension and because of this the present pensioners got more from the system with which they contributed to that on the expense of the next generations. In case of increasing population, increasing activity rate, and stable, long-living firms and life-long employment (in the case of occupational pension schemes) this characteristics of the DB system doesn’t cause a particular problem. For a long while it seemed that the world complies with these requirements, but in our days less and less seems that that it will be that ever again.
6. The new, funded DC pension subsystems worldwide in present days reached the state when the regulators have to think through the payout-phase, designing an annuity-system and (maybe) establishing an annuity market. And just now have turned out, that the task is not obvious, there is worldwide only a few well-functioning private annuities market and these markets are prone to problems easily can be eliminated in a mandatory system. Because of this the task of designing the payout phase of the

mandatory funded DC pension schemes not only not obvious but we practically cannot even adopt an existing model. These models in the practice are mainly non-existents, so the practice hasn't solved their problems, so there is a huge need of a theoretical study.

7. In this dissertation I set just this target for myself: discover the possible, consistent models of the mandatory annuity system, considering the serious problems the annuity providers and their clients can meet in connection with annuities. Although the most models are discussed in this dissertation have references in the literature, but these models mainly appeared on the face of different authors in a kind of heuristic "clear" moment. The possible models are explained systematically first in this dissertation. The main problems, the different models have to solve, the different selections. That is why I discussed the problem of selections especially detail and during this discussion I get a number of new results cannot be found in the literature.
8. It is important to note, that the question of annuity-model appears only in the case of new fundamentally only in the case of compulsory life annuity markets. In the case of voluntary annuity – despite the fact, that the voluntary annuity markets worldwide show the signs of a kind of market failure - there isn't reason enough from the side of the regulator interfering into what kind of need and how the providers want to fulfill. These voluntary annuity markets – from different reasons I don't, but the literature abundantly discuss – are quite smalls. This small size involves a huge selection and that is why only for the fraction of the population is worth to make an annuity contract voluntary. Out of this we can deduce that making an annuity mandatory also makes the regulator's liability to reduce the possible claims of the clients from the annuities. In other worlds the regulator cannot leave the field unregulated, the regulation a kind of duty of the regulator. This duty is especially important in those countries (in the majority of the countries are concerned) where a voluntary annuity market so small, that practically non-existent. But in these countries the missing "legacy system" gives an opportunity to build the mandatory annuity system around a central thought. In other worlds in these countries can accomplish a consistent "annuity-model" and this accomplishment will be the liability of the regulator. Consequently the question of annuity models is relatively new question, the problem of the mandatory annuity markets. This question in those (worldwide) rare cases, when a compulsory annuity is

built on a long-established voluntary annuity market practically not appears and cannot appear. Maybe this is the reason behind the fact that the problem of annuity models is missing from the annuity-literature dominated by authors working on developed annuity markets.

## II. METHODS USED

9. The structure and approach of the dissertation differs from the usual structure and approach of the papers is dealing with annuity and so it can be also considered as novelty. These are characteristically either concentrate on a certain partial problem, or formal, descriptive-types if they are comprehensive and they concentrate on the listing of the possible characteristics of the annuities, not on the interconnectedness of the parts/characteristics. Contrary to this approach I set mapping of the inner web of connections, the hidden structure as a target. This is namely basically important to judge which elements are fit or incompatible to each other in a model. I built up my theses on the cash-flow problems and possible handlings of these problems of a planned annuity. The problems generally can be found in the literature, however characteristically not in a single paper, but some solutions are my own.
10. Consequently the dissertation – after I shortened it from a manuscript containing more parts – consists of three main parts (disregarding the introduction). First I listed the possible problems and solutions connecting to an annuity cash-flow, then I separately deal with the most important cash-flow problems, the selection problems. Quantifying the size of the selection problems I developed an own approach and model on the basis of the classical (discrete and deterministic) actuarial methodology. After this I counted the possible annuity models a complete way. Disregarding the variations in the different models I found six main model options (however this number a little bit discretionary because it depend on what I consider as a model and what as a variation). In this number is not included the possible combinations of the models. I don't really recommend the combinations of the models, however the experience teaches us that the decision-makers cannot resist to this possibility.
11. Writing this dissertation I haven't applied new, special methods and techniques, for its aim and topic didn't make it necessary. My aim was the comprehensive and logical explanation of the topic and I was able to fulfill this aim quite well with the classical technique set. This explanation is characteristically deductive-type, in other world I tried to build up the topic and it's variations as comprehensive as possible on some well-defined principles. So my results come mainly from the logical analysis and not from the literature.



### III. THE MAIN RESULTS OF THE DISSERTATION

12. In the dissertation I have tried to collect as totally as possible the problems a regulator faces when it is creating the regulation of the payout phase of a mandatory, funded defined contribution (DC) pension scheme. The most important problem has to avoid the inconsistency. This inconsistency can easily appear if we cannot discover (and it often happens), that the certain parts of the topic we want to regulate are closely related and so a solution used in one particular area fundamentally determines the solutions can be applied on other areas. That is why a regulator can easily be misdirected if it starts regulation with a “check-list” containing the individual problems of the topic and the solutions to these problems. Instead of this approach the regulator has to choose amongst consistent models and so there is a cardinal importance of theoretically constructing these models. The most important aim of this dissertation was to construct these consistent models. It is also the most important result of it. I have also demonstrated where and how the elements of these models are interdependent. The models introduced in this dissertation are equivalent with each other, so if the regulator wants to choose amongst them, it has to be clearly shaped aims and preferences, to which each model is more fitted, the others are less fitted.
13. The regulation of mandatory life annuities in the countries of Central- and Eastern Europe are on the agenda because of the maturity of the pension reforms of the late '90s. Until the end of 2010 there was also an acute need for a regulation in Hungary. As the consequence of the well known economic political decisions the “acute” nature of this need substantially lowered, but still exists. At the same time the results of the dissertation are not Hungary-specific, and these results can be used in any other similar pension schemes.
14. I want to stress out of the results of the dissertation the original, comprehensive quantitative analysis of the selection effects, whereon in the dissertation a lot of model-elements are built.

#### IV. MAIN REFERENCES

The following papers contain the “intuitive” descriptions of certain models. The OECD model:

- Antolin, Pablo [2008b]: Policy Options for the Payout Phase- OECD Working Papers on Insurance and Private Pensions No. 25, 2008.:  
<http://www.oecdilibrary.org/docserver/download/fulltext/5kzdkqv1ct23.pdf?expires=1266832929&id=0000&accname=freeContent&checksum=F5C553941A5DFB3F0B13F952C6227CDB>
- Antolin, P., C. Pugh, and F. Stewart [2008]: Forms of benefit payment at retirement, OECD Working Paper on Insurance and Private Pensions, No. 26.:  
<http://www.oecdilibrary.org/docserver/download/fulltext/5kzdkqtclgt.pdf?expires=1266833017&id=0000&accname=freeContent&checksum=A0982206BCDB1F272BBC156F896098DA>
- To this serves with an important theoretical basing: Milevsky, Moshe [2005]: Real Longevity Insurance with a Deductible: Introduction to Advanced-Life Delayed Annuities (ALDA), NORTH AMERICAN ACTUARIAL JOURNAL, VOLUME 9, NUMBER 4, 2005, október, 109-122 o. - <http://www.soa.org/library/journals/north-american-actuarial-journal/2005/october/naaj0504-8.pdf>
- The idea of the alternative SoS model appears very shortly: Barabás-Bodor-Erdős-Fehér-Hamecz-Holtzer [2006]: A nyugalom díja - 2006.10.16 08:00 - <http://portfolio.hu/cikkek.tdp?k=2&i=74942> - rövidített változatban az Élet és Irodalom 2006. október 13-i, 41. számában <http://www.es.hu/index.php?view=doc;14718>
- or: James, Estelle (szerk.) [1994]: Averting the Old Age Crisis - A World Bank Policy Research Report World Bank, Oxford University Press 1994 402 o.
- The model of central provider is suggested here: Stahl János [2000]: Hogyan lesz nyugdíj a magánpénztárba befizetett járulékból? In.: Körkép reform után – Tanulmányok a nyugdíjrendszerről, Közgazdasági Szemle Alapítvány, 2000. 204-221.o.
- The “father” of the central pool model basically Németh György, who describes his model also quite briefly: Németh György [2006]: Kibújhat-e kényszerzubbonyából az aktuárius? - Észrevételek Stahl János cikkéhez és Arató Miklós hozzászólásához - KSZ 2006.6.: <http://www.kszemle.hu/tartalom/cikk.php?id=849>

With the selection effects which play a key-role in the dissertation, in the literature quite few authors are dealing with. The most important two articles were written by Amy Finkelstein and James Poterba, although their approach is totally different that I use in my dissertation:

- Finkelstein, A. and Poterba, J. [2002]: Selection effects in the United Kingdom annuities market. Economic Journal 28-50 - <http://econ-www.mit.edu/files/1816>
- Finkelstein, Amy – Poterba, James [2004]: Adverse Selection in Insurance Markets: Policyholder Evidence from the U.K. Annuity Market, journal of political economy, 2004, vol. 112, no. 1, 183-208  
[http://porter.ssc.upenn.edu/~hfang/teaching/socialinsurance/readings/fudan\\_hsb\\_c/Finkelstein\\_Poterba04\(2.11\).pdf](http://porter.ssc.upenn.edu/~hfang/teaching/socialinsurance/readings/fudan_hsb_c/Finkelstein_Poterba04(2.11).pdf)

My general knowledge about annuities come from mainly the following books:

- Bein Károly, Bogyó Samu és Havas Miksa [1907]: Politikai számtan II. rész – Az élet-, a rokkantsági- és a nyugdíjbiztosítás elmélete és gyakorlata, Franklin-társulat Budapest 1907.
- Bowers, Gerber, Hickman, Jones, Nesbitt [1986]: Actuarial Mathematics, The Society of Actuaries, Itasca, Illinois, 1986.
- Gerber, Hans U. [1995]: Life Insurance Mathematics (with exercises contributed by Samuel H. Cox) second, expanded edition Springer/Swiss Association of Actuaries Zürich Berlin, stb. 1995 217 o.
- Krekó Béla [1994]: Biztosítási matematika – Életbiztosítás I., Aula, Budapest, 1994.
- Weninger Vincze [1869]: Politikai számtan n.j. n.j. Kb. 1869.

## V. OWN PUBLICATIONS ABOUT THE TOPIC OF THE DISSERTATION

I have been dealing with this theme for a long time and from different angles. I summarized the insurance and actuarial basics regarding to annuities in my life insurance book:

- Banyár József [2003]: Életbiztosítás – Aula, Budapest

I have been also taking part since a lot of time in preparation of the possible NDC based reform of the Hungarian Social Security. In case of this kind of reform it would also appear in the PAYG Social Security sub-system the annuity-based calculation, so my papers about this topic necessarily are dealing with annuity as well:

- Modellszámítások a virtuális egyéni számla alapú nyugdíjrendszer esetére, Kézirat a PM megbízásából – 2001. június 4.
- Az NDC rendszer – Vitairat az ONYF megbízásából – 2001. november 25.
- Banyár József – Mészáros József [2003]: Egy lehetséges és kívánatos nyugdíjrendszer, Gondolat, Budapest
- Banyár József – Mészáros József [2004]: Egy lehetséges nyugdíjreform és indokai, Társadalom és Gazdaság 26 (2004) 2, 113-141. o.
- A nyugdíjvita folytatódik - az NDC bevezetése, mint taktikai lépés (Dr. Banyár József), 2006. november 2. Hozzászólás a Portfolio.hu-n folyó nyugdíjvitához - [http://portfolio.hu/gazdasag/nyugdij/a\\_nyugdijvita\\_folytatodik\\_az\\_ndc\\_bevezetes\\_e\\_mint\\_taktikai\\_lepes\\_dr\\_banyar\\_jozsef.75628.html](http://portfolio.hu/gazdasag/nyugdij/a_nyugdijvita_folytatodik_az_ndc_bevezetes_e_mint_taktikai_lepes_dr_banyar_jozsef.75628.html)
- József Banyár and József Mészáros [2009]: A Possible and Desirable Pension System, Social Science Monographs, Boulder, Colorado Center for Hungarian Studies and Publications, Inc. Wayne, New Jersey, Distributed by Columbia University Press, New York, 2009.
- Banyár József-Gál Róbert Iván-Mészáros József [2010]: A névleges egyéni számlás rendszer, In: Jelentés a Nyugdíj és Időskori Kerekasztal tevékenységéről, Miniszterelnöki Hivatal, Budapest, 2010. 14. melléklet

In the same time I have been dealing with for a long time the preparation of the regulation of the private annuity system. My papers about this:

- A szolgáltatási albizottság javaslatai a magánpénztári járadékszolgáltatásokkal kapcsolatban, kézirat a PM megbízásából, 2001. november
- Banyár József [2002]: A nemek közötti direkt átcsoportosítás a nyugdíjszámlákon – egy új megközelítés Sigma, 2002. 3-4. szám, 141-158.o.
- Banyár József [2009]: A magánnyugdíj-járadék szabályozása - megjelent Stabilitás Pénztárszövetség 2009-es évkönyvében
- A kötelező nyugdíj-járadék lehetséges modelljei – előadás a Pénztárszövetség 2010. október 14-15-i konferenciáján - [http://stabilitas.hu/wp-content/uploads/dr\\_Bany%C3%A1r\\_J%C3%B3zsef\\_20101014.pdf](http://stabilitas.hu/wp-content/uploads/dr_Bany%C3%A1r_J%C3%B3zsef_20101014.pdf)

The questions of a NDC-based reform and the regulation of annuities are closely related in my following papers and speeches:

- Banyár József - Gál Róbert Iván - Mészáros József [2007]: Van megoldás – nyugdíjreform, Budapest, Barankovics István Alapítvány, 2007. Benne önálló tanulmányként: Banyár József: A kötelező életjáradék lehetséges működése és szabályozása 254-371.o.

In the annex of this comprehensive reform-conception was published the first version of the present dissertation as an independent paper. The year 2007 version mainly differ from the present one, that there I described only one model (the insurance annuity model) instead of the here described 6 models. As a response to the debates over this paper I have formulated the conception, that not only one, but more consistent models are exist, however the number of this kind of models are finite. The two topics are also closely related on the Portfolio.hu conference in 2010, where I spoke about these on consecutive days - Portfolio.hu - NYIKA Nyugdíjkonferencia 2010, 2010. március 25-26.:

- Önfenntartó NDC és "időleges" NDC (teljes tőkésítés) - A beszélgetés résztvevői: dr. Banyár József, Gál Róbert Iván, Mészáros József
- Panelbeszélgetés: Milyen járadék kell, és milyen nem a második pillérben? A beszélgetés résztvevői: Dimitri Vittas, dr. Banyár József, Dr. Borza Gábor, Gaál Attila