Chapter 10
Modeling the Impact of Crises on Evolution of Pension Systems

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ABSTRACT

The purpose of this chapter is twofold: to assess the relationship of the nonlinear dynamics of pension systems and economic cycles, and to develop a descriptive evolutionary model of the stages of pension systems. Hodrick-Prescott filter is used to identify cycles in the pension and economic dynamics. The study proved empirically that the evolutionary dynamics of pension systems depends on the cyclicity of national and world economies. In addition, the bifurcation points associate with big Kondratiev cycles, and the fluctuations of the indicators of pension systems correlate with the medium-term Juglar cycles. The crisis starts pension reforms. The results of this study indicate that public pension spending growth is countercyclical and coincident indicator relative to the global business cycle in 13 countries from 21 of the OECD countries studied. The amount and volatility of public pension spending depends on the basic pension model and has higher values in Bismarck-model countries.

INTRODUCTION

The degree of reduction of the financial sustainability of pension systems that invariably follows soon after major financial and economic crises depends on the depth and duration of the slump of national and global economies. Pension systems of many countries are still feeling the consequences of the global financial and economic crisis of 2008–2009. The imbalance between pension contributions and benefits, which is associated with profound declines in output and employment, is slowly recovering in the face of slow economic growth and, as a consequence, public pension spending remains high. These current challenges are compounded by both the phenomenon of “population aging” and “institutional aging” of the public redistributive pension systems known as PAYG-systems (financed on a pay-as-you-go basis).

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The systemic pension crisis is long-term and compels governments to carry out not only parametric, but also structural pension reforms. Making decisions on pension reforming requires knowledge of the general patterns and the possible scenarios of the development of national pension systems, as well as the degree of correlation between pension dynamics and fluctuation of the economy. The understanding which stage of the pension evolution and economic cycles the pension system is on will allow governments to make timely strategic decisions in the field of pension reforming.

The purpose of this study is twofold. First, this study will assess the relationship of the nonlinear dynamics of pension systems and economic cycles. Secondly, in this study will develop a descriptive evolutionary model of the stages of pension systems. The results of the modeling will show the degree of impact of crises on the evolution of pension systems.

BACKGROUND

Multiple research studies have examined the certain aspects of the evolution of pension systems. For instance, Orenstein (2003) treats pension reform as a political innovation and applies the diffusion of innovations theory. The study convincingly shows that international diffusion of pension systems follows the usual distribution pattern for adoption of innovations—a few countries are pioneers, followed by a steep increase in the rate of adoption, with a few laggards filling in at the end. The author examines the prospects of modern pension reforms by comparing the current spread of multi-pillar reform with the earlier diffusion of first pension system adoptions between 1889 and 1994. This approach helps to better understand the global context of pension reform, as well as the reasons and mechanisms of its spread. However, such global studies of the diffusion of pension systems and reforms are relatively few.

Lindeman et al. (2000) show how the pension systems of Eastern Europe and Central Asia responded to the new political and economic realities of the 1990s. Most of the countries in the region have replaced the state monopoly PAYG-system by a multi-pillar system that consists of a PAYG pillar and funded pillars. The authors evaluated the labor market effects and the long-term balance of pension systems and the size of the second pillar and financing the transition. However, the study only covers post-socialist countries and a short historical period.

Research in the United State (The Evolution of Public Pension Plans, 2008) found that demographic and economic pressures have led some public defined benefit (DB) plans to reexamine their plan designs, and consider blending DB and defined contribution (DC) plan features. Another research carried out by Yermo and Severinson (2010) examined the impact of the financial crisis on DB plans and proposed to develop countercyclical funding rules to enhance the sustainability and security of DB plans. However, it is important to distinguish between temporary impacts of the economic cycle on sponsor cash flows and long-term, structural changes to strengthen the plan funding status. However, the authors mainly focus only on the discussion of some regulatory initiatives that could be considered to promote procyclicality of funding rules for DB plans. It must be added that in the OECD Recommendation on Core Principles of Occupational Pension Regulation (OECD, 2009) it was noted that the "funding rules should aim to be countercyclical, providing incentives to build reserves against market downturns" (guideline 3.18).

Hinz et al. (2009, October) used World Bank's PROST1 (The Pension Reform Options Simulation Toolkit) projection model to undertake a series of "stress test" simulations that evaluate the impact of the crisis on both the short and long term financial status and benefit outcomes of several prototypical pension systems of the three regions that have been developed (Central Europe (CE), Latin America and