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Long-run effects of unfunded social security with earnings-dependent benefits

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Abstract

This paper examines the effects of unfunded social security with bequests, fertility and human capital by considering a mix of earnings-dependent and universal social security benefits. We show that social security is more likely to promote growth by reducing fertility and increasing human capital investment if its benefits are more dependent on individuals' own earnings. Through simulations, we find that the differences in the effects of social security resulting from variations in the benefit formula can be too substantial to be ignored. We also investigate the welfare effect in calibrated economies.

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1. Introduction

Unfunded social security has been instituted in many countries, and its effects on the economy have been controversial in the large body of literature. It depresses private savings in a life-cycle model (e.g. Feldstein, 1974), but is neutral in a dynastic-family model through private intergenerational transfers (e.g. Barro, 1974). This neutrality breaks down, however, when fertility is endogenous (e.g. Becker and Barro, 1988): social security may reduce fertility and increase “capital intensity” through increasing the bequest cost per child.

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There have been many studies of social security with endogenous fertility since. For example, [Zhang \(1995\)](#) found that unfunded social security with an equal benefit to every individual may do better for long-run growth than funded social security that may or may not link the benefits to individuals' own contributions. [Zhang and Zhang \(1995\)](#) found that the effects of social security on fertility and growth are weaker if social security benefits are linked to individual-specific fertility than to average fertility. In [Ehrlich and Lui \(1998\)](#) with the companionship of children or an implicit contract between parents and children, social security reduces at least one of three variables: fertility, savings, and human capital. [Zhang and Zhang \(1998\)](#) compared the growth effects of social security with different types of altruism toward children. And [Zhang \(2001\)](#) examined the effects of social security with different types of tax.

Many other factors that may influence the effects of unfunded social security have also been examined in the literature. With public investment in education in [Kaganovich and Zilcha \(1999\)](#), social security may enhance growth and welfare. In [Belletini and Ceroni \(1999\)](#), social security with benefits indexed to future wages may induce taxpayers to support public investment in infrastructure, and therefore may foster growth. [Fuster \(1999\)](#) explored how social security, as insurance against children having low income, may affect saving and wealth distribution in a numerical analysis of the US social security system that links the benefits to individuals' own earnings. With majority voting among overlapping generations, [Cooley and Soares \(1999\)](#) argued that social security can be adopted and sustained as a political and economic equilibrium. [Corneo and Marquardt \(2000\)](#) emphasized the importance of considering unemployment insurance in dealing with social security, while [Sánchez-Losada \(2000\)](#) used a model with bequests arising from joy-of-giving.

These studies (except [Fuster, 1999](#)) have overlooked an important feature in the benefit formula of unfunded social security: individuals' benefits are directly linked to their own earnings in many countries such as France and the US (see [Diamond et al., 1980](#); [US Department of Health and Human Services, 1999](#)). This overlook is not trivial since the earnings-dependent benefits add to the return on human capital investment and to the opportunity cost of investing time in children. By contrast, a universally equal amount of social security benefits, typically assumed in the literature, depends only on economy-wide average variables (such as wage and fertility) that are not internalized by atomic individuals. In principle, the division between earnings-dependent and universal benefits should affect individuals' decision on fertility and human capital investment (and hence growth) at the margin. Thus, it is essential to see how or to what extent variations in the benefit formula will alter the effects of pay-as-you-go social security.

In this paper, we investigate unfunded social security in a two-sector growth model with operative bequests, fertility, and human capital investment by focusing on a general benefit formula that comprises earnings-dependent and universal components. We attempt to evaluate the implications of exogenously changing the benefit formula along the long-run equilibrium path. Our work substantially differs from the related studies. In [Fuster \(1999\)](#), for example, only the specific benefit formula in the US system is used in numerical calibrations, and the effects of social security on fertility and human capital investment are not considered. In [Zhang \(1995, 2001\)](#), although fertility

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