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Temptation and social security in a dynastic framework

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ABSTRACT

We investigate welfare and aggregate implications of a pay-as-you-go (PAYG) social security system in a dynastic framework in which individuals have self-control problems. The presence of self-control problems induces individuals to save less because of their urge for temptation towards current consumption. Individuals' efforts to balance between the short-term urge for temptation and the long-term commitment for consumption smoothing result in self-control costs. In this environment PAYG social security works as a self-control cost reducing device. In contrast, the presence of altruism induces individuals to save more. This in turn mitigates the adverse effects of self-control problems and PAYG social security on savings but magnifies the self-control costs. We find that in our environment the adverse welfare effects of a PAYG system are further mitigated relative to the environments that incorporate altruism and self control issues separately. However, the level of mitigation is quite modest.

1. Introduction

Many countries including the US run a pay as you go (PAYG) social security system in which tax revenues collected from current workers pay current retirees' benefits. Because the PAYG system substantially affects individuals' fundamental economic decisions and it is one of the largest expenditure items in a government's budget, aggregate and welfare effects of it have been analyzed quite extensively in the public finance literature.

In the standard models of social security it is assumed that individuals save to smooth their consumption and insure against idiosyncratic productivity shocks and a longevity risk. It has been known for a while that individuals' saving decisions are also be affected by their altruistic concerns and self-control problems. There is a number of studies that analyze the implications of the PAYG system in the settings in which individuals have either altruistic concerns or self-control problems but we do not yet know the implications of the PAYG system when altruism and temptation coexist. In this study, we develop a model economy that incorporates those factors and investigate the aggregate and welfare implications of the PAYG system accordingly. In particular, we address the following two questions. *First*, what are the effects of temptation and altruism together on individuals' inter-temporal allocations and welfare? *Second*, what are the role and effects of the PAYG system in that environment?

The benefits and costs of the PAYG system are well documented in the literature: the PAYG system provides an insurance against longevity and income risks but, at the same time, distorts individuals' saving and labor supply decisions.

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Using a deterministic standard overlapping generations (OLG) model, Diamond (1965) shows that social security reduces the steady-state capital stock because it taxes workers who have a high propensity of saving in order to pay benefits of retirees who have a low propensity of saving. A decrease in the steady-state capital stock, in turn, reduces welfare when the economy is dynamically efficient. Auerbach and Kotlikoff (1987) assess the magnitude of welfare losses using a deterministic large-scale OLG model and find that social security always results in a welfare loss. Hubbard and Judd (1987) analyze the extent of insurance benefit of social security in an incomplete market setting where individuals have stochastic life-span. They show that even in the environment that social security provides insurance against longevity risk, it still decreases welfare. Imrohoroglu et al. (1999) extend Hubbard and Judd's study by incorporating individual earning uncertainties. They show that the PAYG's adverse effects dominate its insurance benefits.

Individuals' altruistic concerns affect the extent of the PAYG system's costs and benefits. There is a strand of the literature that analyzes the effects of social security by using dynastic models. In a seminal work, Barro (1974) shows that if a bequest motive is operative then private transfers can neutralize the effects of public transfers and public debt i.e. Ricardian equivalence holds. Fuster (1999) demonstrates that when individuals have bequest and inter-vivos transfer motives (two-sided altruism), social security is less detrimental to the capital stock in an economy. Fuster et al. (2003) develop a dynastic OLG model with inelastic labor supply. They show that social security's insurance benefit dominates its crowding-out effects on saving and hence, the steady-state welfare increases with social security for most of the households.

Potential idiosyncrasies in individuals' preferences are another important source of uncertainty regarding the welfare implications of social security.[1] Imrohoroglu et al. (2003) investigate the welfare effects of a PAYG system when individuals have time inconsistent preferences. Social security in that environment works as a commitment device i.e. social security saves on behalf of individuals who, otherwise, would not save enough for their retirement. They show that the existence of a PAYG social security is less detrimental to welfare when individuals have time-inconsistent preferences. Bucciol (2011) and Kumru and Thanopoulos (2008) incorporate self-control preferences into a model of social security. They show that social security mitigates individuals' self-control costs by reducing their available wealth and hence, it might improve welfare.

There is sound empirical and experimental evidence that individuals suffer from self-control problems. Frederick et al. (2002) provide an overview of experimental studies documenting that individuals indeed exhibit bias toward immediate gratification. Huang et al. (2007) and Bucciol (2012) study the empirical relevance of self-control preferences using household-level data from the Consumer Expenditure Survey. Their estimates support the presence of temptation.[2] There is also a number of studies that provide empirical evidence that individuals have altruistic concerns. Bernheim (1991) presents evidence in support of the view that a significant fraction of total savings is motivated by the desire to leave bequests. Kopczuk and Lupton (2007) find that roughly three-fourths of the elderly single population has a bequest motive and both the presence and the magnitude of the bequest motive are statistically and economically significant. Moreover they show that, on average, households with a bequest motive spend about 25% less on consumption expenditures.[3]

In this paper we analyze the macroeconomic and welfare effects of a PAYG system in a setting with both two sided altruism and temptation. To conduct our analysis we first develop a simple two period model similar to that of Krusell et al. (2009).[4] Our simple model helps us to understand how the interaction between altruistic concerns and urge for temptation influences the effects of the PAYG system on individuals' saving decisions. We show that altruistic individuals with self-control problems face larger self-control costs when they are young because they save not only for their old age consumptions but also for to leave bequests. In such an environment, we show that the PAYG system provides an additional benefit: reducing self-control costs. In contrast to non-altruistic individuals, altruistic individuals face self-control costs when they are old too. Yet, the PAYG system does not provide any relief for old age self-control costs. Our simple model shows that the complex interaction between altruistic concerns, urge for temptation, and the PAYG system has substantial impacts on savings and self-control costs. This, in turn, raises the possibility that welfare implications of social security might differ from those of the previous studies, which incorporate altruistic concerns and self control issues separately to large-scale general equilibrium OLG models.

[1] The experimental economics literature documents that subjects who face inter-temporal choice problems often show preference reversals. The first formal analysis of preference reversals was conducted by Strotz (1956). Later, Laibson (1997) adopts the structure that was created by Phelps and Pollak (1968) to analyze inter-generational altruism to model preference reversals. Laibson modifies the standard exponential discounting model by incorporating an additional discounting factor that captures the present-bias. The new discounting factor distorts the time-consistent feature of the standard exponential model. Laibson's preference structure is often called as time-inconsistent preferences. Gul and Pesendorfer (2004) attempt to explain the same phenomenon by creating self-control preferences that depend not only on an agent's actual consumption but also on the agent's hypothetical temptation consumption.

[2] Further empirical evidence is provided by Ameriks et al. (2007), Fang and Silverman (2009), Gruber and Koszegi (2001), and Angeletos et al. (2001). Ameriks et al. (2007) develop a survey instrument to measure self-control problems and apply it to a sample of highly educated adults. They find that self-control problems are smaller in scale for older than for younger individuals. Moreover, in a recent paper Fang and Silverman (2009) empirically identify the existence of time-inconsistency that stems from self-control problems, through the estimation of the structural parameters of a dynamic labor supply model. Similarly, Gruber and Koszegi (2001) recognize that there is strong evidence that preferences related to smoking are time-inconsistent, while Angeletos et al. (2001) show that models featuring time-inconsistent preferences perform better in matching the available consumption and asset allocation data drawn from the Panel Study of Income Dynamics and the Survey of Consumer Finances.

[3] Further evidence regarding with the positive impact of the bequest motive on savings can be found on Hendrik Jurges (2001) and Lockwood (2011).

[4] They analyze taxation issues in a non-altruistic setting.