Evaluating an old-age voluntary saving scheme under incomplete rationality

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Overlapping generations (OLG) models, as pioneered by Diamond (1965) as well as Auerbach and Kotlikoff (1980), constitute a useful tool to provide an ex ante policy evaluation of potential reforms to the pension system. Recently, in Poland, the voluntary old-age saving schemes were introduced, Employees' Capital Plans (ECPs). They feature tax exemptions and lump-sum transfers to the participants, as well as other nudges to encourage wide participation and foster capital accumulation by the working-age cohorts. The purpose of this paper is to provide welfare, fiscal and general macroeconomic evaluation of this novel instrument.

Notwithstanding the policy objective, there is also an academic aim. Namely, fully rational agents with perfect foresight about the future, do not respond to instruments whose objective is to raise savings, because they have already optimized their lifetime consumption and leisure path (Gale and Scholtz, 1994; Garriga and Conesa, 2008; Kitao, 2014). If some government instruments arise, they crowd out private voluntary savings (Poterba et al., 1995; Butler, 2001; Blau 2017). Unless the method of implementation generates strong general equilibrium effects, instruments aiming at raising private voluntary savings for the old-age have neutral effect on economy. Given these rather fundamental premises, we extend an otherwise standard overlapping generations model to incorporate agents with incomplete rationality. To the best of our knowledge, this is the first such extension of an OLG model to analyze voluntary old-age saving schemes

In our setup, a fraction of each cohort exhibits hand-to-mouth (HTM) behavior, which is consistent with a number of empirical regularities identified earlier in the literature (Weil, 1992; Kaplan et al, 2014; Heathcote and Perri, 2018; Olafsson and Pagel, 2018). HTM agents generally consume all the contemporaneous income, hence accumulates no assets in the working periods to finance consumption in the retirement periods. Since replacement rates between earned income and pension benefits are typically lower than 1, this type of agents experiences a sudden drop in consumption at retirement. By providing them with a vehicle to smoothen consumption over lifetime, we expand substantially their choice sets, effectively automatically raising welfare for this group of agents (Krussel and Smith, 1998). The overall effects depend on the magnitude and size of welfare effects for the fully rational agents and the general equilibrium effects for both groups of agents.

There are good empirical reasons to include agents with incomplete rationality into an overlapping generations general equilibrium framework. First, there appears to be a mismatch between the empirical evidence on savings response by the households and the predictions from a structural macroeconomic model. For example, the 1999 change in Polish pension system raised incentives to private voluntary savings – the expected pension wealth was reduced due to expected decline in pension benefits. This phenomenon was empirically analyzed by Lachowska and Myck (2018) who find average increase in savings of approximately 0.3 PLN for each 1 PLN lost in pension wealth (or: 30%). Similar magnitude of the crowing out effects was provided for Spain by Ayuso et al., (2007). Meanwhile, macroeconomic models calibrated to replicate the features of Polish economy (Hagemejer et al, 2017) imply a much stronger reaction. Introducing HTM consumers to an economy allows to align the macroeconomic implications with the microeconometric evidence.

Our study thus combines two objectives: it provides an ex ante policy evaluation in a methodologically novel context of overlapping generations with incomplete rationality. Once we develop the model, we use the demographic forecast to simulate

the status quo (as if ECPs were not introduced at all) and a set of reform scenarios, with several variants of ECPs implementation. Participation in ECPs is endogenous. In the case of each reform scenario we provide an evaluation of macroeconomic (capital, labor, prices) and fiscal consequences (tax revenues, expenditures). We also provide welfare accounting of those reform scenarios. We measure the welfare effects as consumption equivalents, through compensating variation of lifetime consumption.

While to the best of our knowledge this is the first evaluation of ECPs, we are certainly not the first to use OLG to provide ex ante policy evaluation. In the case of Poland, the previous attempts include an analysis of 1999 pension reform (Makarski et al., 2017), analysis of the extensions in the retirement age from 2011 (Bielecki et al., 2016; Makarski and Tyrowicz, 2019) and an analysis of the 2013 changes in the pension system (Hagemejer et al., 2015). In terms of similar instruments, Borsch-Supan discusses evidence from across European countries and evidence for the so-called Riester Plan from Germany. Yang (2016) analyze an instrument very similar to the case of Polish ECPs, as introduce in Taiwan, in an empirical context. Similar studies analyze the effects of private voluntary old-age saving schemes in Canada (Messacar, 2018), as well as the UK and the US (Attanasio et al., 2004), among others.

We find that the crowding out effect of ECPs is considerable. In fact, the general equilibrium effects of ECPs are too small to reduce crowding out among the fully rational agents and effectively only the HTM consumers raise savings. The fully rational agents observe a decline in welfare due to the negative general equilibrium effects – mainly high fiscal cost of ECPs. The HTM agents observe large increase in welfare due to being able to smoothen consumption over lifetime, despite the fiscal costs.

Increasing longevity challenges the design of individual lifetime consumption paths and savings profiles. In order to reduce old-age poverty, a substantial increase in savings is required. Many governments introduce policies aiming to foster old-age savings. In Poland, as of 2019, Employees' Capital Plans are being gradually introduced. They offer tax exemptions and lump-sum transfers to the participants. We provide an ex ante evaluation of this instrument. We add behavioral heterogeneity in the form of the hand-to-mouth agents, to an otherwise standard overlapping generations model. This enriched model is further extended to account for endogenous participation in old-age savings instrument, which replicates the features of ECPs.

Our analysis suggests that the ECPs will cause relatively humble increase in total capital in the economy. Total assets of the HTM agents are increased, but the fully rational agents displace assets from (taxed) private voluntary savings to the ECPs (which are exempt from capital gains taxation). In addition, the general equilibrium effects, mainly increased taxes and decreased interest rate, discourage the fully rational agents from saving. Overall, the increased asset holdings by HTM agents are counterweighed by reduced asset holding by the fully rational agents. Overall long-run effects of the ECPs for capital creation range between 0.8% and 3.0% relative to baseline. Back of the envelope computation which excludes both the crowding out and general equilibrium effect would yield a long-run capital increase of roughly 3.8-8.8% relative to baseline, for the lower bound and the upper bound of the ECPs contributions, respectively. The general equilibrium effects also bring a decrease in labor supply, though when ECPs offer annuity then the implicit decrease in effective marginal labor tax rate is enough to increase aggregate labor supply above the baseline level.

Although there are many factors driving the fiscal costs of the ECPs, two of them quantitatively dominate the others: reduction in capital gain tax base and lump-sum transfers. These two channels account for 84%-94% of the entire fiscal adjustment, which needs to be financed through increased taxation. The consumption tax rates will have to increase by roughly 1-2 percentage points relative to baseline. The increase in the consumption tax is compensated in welfare terms for the hand-to-mouth agents,

but is not compensated for the fully rational agents. With endogenous participation, the fully rational agents participate in ECPs, but would rather live in a baseline scenario of status quo.

We show that ECPs raise consumption of HTM agents in the old age, whereas for the fully rational agents the ECPs raise consumption increases when the agents are young. The mechanisms which explain these patterns are as follows. Introducing the ECPs reduces disposable income for the HTM agents when they work, but the benefits from ECPs substantially increase their disposable income after retirement. Meanwhile, the fully rational agents can actually increase consumption during the working period, because ECPs offer a capital income tax exemption, which rises effective rate of return on assets.

Those results have to be taken with a grain of salt. HTM agents operationalize a vast plethora of possible behavioral patterns, some of which are conceptually inconsistent with the welfare gain. Notably, if agents do not save because they do not want to smoothen consumption, instruments such as ECPs cannot actually raise welfare and HTM agents will opt out of participation. If agents do not save because they cannot do so, ECPs will enrich their choice sets and actually raise welfare. Models such as our OLG cannot distinguish between these two types of agents, but also empirical evidence on the sources of hand-to-mouth consumption is scarce at this point, calling for more research in the field.

There are several potential caveats to be mentioned in the summary of our study. Admittedly, agents in our model inhabit a deterministic world with no concerns about the commitment of the government to actually stick to implementing ECPs. In the real world, idiosyncratic labor income and capital income shocks raise uncertainty about future income, the extent of longevity is not fully predictable and governments are known to default on pension obligations and capturing pension assets. We are not aware of any large scale macroeconomic simulation models who would be able to fully account for uncertainty about policy and longevity, but introducing income shocks to our setup could make agents seek safe assets and thus potentially consider ECPs as a superior investment strategy relative to own investment (e.g. due to the ability to fully diversify financial markets risks).

Also, our model isolates the effects of ECPs, holding all other economic processes constant between the baseline and reform scenario. Hence, one cannot use the implications of our model as a prediction of what will actually happen in the Polish economy. The introduction of ECPs is going to occur post the peak of the business cycle, accompanied by substantial changes in social transfers and fiscal policy. Isolating the effects of ECPs from those other factors in observational data may indeed be impossible. Moreover, in our model agents could not accumulate old-age savings in any tax incentivized instruments prior to ECPs, whereas in reality there exist some legal vehicles (such as employee pension plans, individual savings account, etc). While participation rates are low for those instruments, our model cannot be used to predict if enrollment in ECPs and those instruments are related.

The complete results of our research are published in the articles:

Artur Rutkowski (2019). Evaluating an old-age voluntary saving scheme under incomplete rationality. IBS Working Paper 06/2019. http://ibs.org.pl//app/uploads/2019/07/IBS_Working_Paper_06_2019.pdf

Artur Rutkowski (2019). Evaluating an old-age voluntary saving scheme under incomplete rationality. GRAPE Working Papers 34, GRAPE Group for Research in Applied Economics.