Policy Brief

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Linking Education and Pensions in Transition: A Comparative Study

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Summary

There is vast theoretical and empirical literature that researches into the relationship between human capital investment (e.g. public education) and the pension systems. This theory is referred to as "return on human capital investment" and considers public pension as a return on the investment in human capital of the next generation. This investment was made by the generation of current retirees when they were middle-aged and paid taxes partially used to educate their "offspring". On the other hand, the debt which the young incur by educating themselves is repaid through taxes when middle-aged; these taxes are transferred to the old as pensions. Interconnected pension and public education systems can replicate the allocation achieved by the complete markets, where young can borrow against future income. The two systems are connected through implicit rates of return on the public schooling expenditures and social security taxes. This scheme is equivalent to intergenerational transfers among three generations: the young, the old, and the middle aged.

Guided by this theoretical framework, we extend it to an OLG calibration study of interconnected pension and education systems for Russia and the Czech Republic under different scenarios of demographic and economic development. Both systems are undergoing deep changes, and the study proposed here might prove to be useful in informing policymakers about desirable directions of reforms of the educational and pension systems. Comparison of Russia and the Czech Republic is interesting in par-

ticular because of different structure of funding of higher education. While in the Czech Republic it is mostly free *de facto,* in Russia it is so only *de jure.* Only about 50% of slots in Russia are publicly funded, with the residual funded privately either directly or indirectly, through various corruption schemes. This difference suggests less costly transfer in Russia to a system where education is not "free" but represents an explicit individual asset with corresponding liabilities.

What is known

In their recent paper, Boldrin and Montes analyze the "return on human capital investment" model and show that if taxes and transfers are lump sum, then such scheme can replicate the first-best allocation achieved in an economy without taxes where borrowing for human capital accumulation (education) is allowed. Taking into account that such borrowing is either absent or inefficient in many countries, combined public education/public pensions scheme might prove welfare enhancing.

However, in OLG framework such a conclusion might be sensitive to the specification of education subsidy. For example, Docquier and Michel have considered a similar three-period OLG model with education subsidies and old-age pensions. Education in this model costs time and money (in contrast with the preceding model where only monetary costs are present), and both costs are subsidized. Taxes are proportional, unlike lump sum ones used by Boldrin and Montes. Calibrated model suggests that in such a case it might be desir-

able to finance significant proportion of education subsidies with lump sum *taxes* on retirees instead of proportional taxes on the middle aged combined with *pensions* to the retirees.

Yet another approach to educational subsidies was presented by Benabou. In a setting with a continuum of infinitely-living heterogeneous agents, government can impose distorting (progressive) taxes, consumption taxes, and pay proportional subsidy to human capital accumulation. The model incorporates borrowing constraints: Investment in education is possible only by not consuming a part of income. In addition to a usual egalitarian motive for redistribution, government has an incentive to transfer income to the poor, because this augment resources available for human capital investment, and the latter leads to an increase in average income in presence of diminishing returns to human capital investment. However, the Benabou's approach has not been yet scrutinized in three-period OLG context.

The Model

We extend Benabou's model to overlapping generations setting and study the optimal amount of redistribution in this case. In the full-fledged model, agents live for three periods. When young, they produce using labor and inherited human capital. Part of the income is not consumed and directed to the human capital accumulation instead. In the middle age, agents consume and invest into human capital, while only consumption takes place in the last period. In all three periods, agents are subject to pro-

gressive taxation with parameters dependent on the agent's age; they receive education subsidy in the first period, and pay consumption tax in all three periods. For simplicity, consumption tax cannot be differentiated based on the agent's age.

In the above setup, the only channel of "savings" is through human capital investment. The agents "save" in periods one and two, but only in the first period they receive education subsidy. Functional forms chosen for the agents' utility and production functions (identical to Benabou's) guarantee that a closed form solution exists, which can be exploited to develop economic intuition. Optimal net transfers to (or from) a particular generation allow one to consider intergenerational flows of resources. Heterogeneity of the agents, coupled with borrowing constraints, generates incentives to redistribute income. Our study is focused on the complex interplay between net resource transfers (intergenerational transfers) and amount of redistribution (intragenerational transfers) in different generations, and the effect of initial inequality among the agents on these flows.

The model is calibrated on the two sets of data. Following the methodology developed by Boldrin and Montes, we use Russia Longitudinal Monitoring Survey, and Czech Household Survey to collect information for each individual in the sample on school attendance, highest educational level attained, work experience, and wages and pensions received. In turn, this panel data allows for the estimation of the amount and value of public school services received, the amount of taxes paid, and the amount of public pensions received. To adjust for possible intertemporal changes, we also look at retroactive surveys on individual employment, education, and earnings that cover the period of 1989–1996 for the Czech Republic and 1996–2000 for Russia. Finally, to take account of the demographic evolution of the Czech and Russian populations, we use medium- and long-term demographic projections available from national statistical offices and Ministry of Labor.

Findings and Policy Recommendations

Out study suggests that interconnected pension and public education systems could provide policymakers with a good framework, as far as education and pension reforms are concerned. One way of implementation of intergenerational transfer scheme is to issue debt ("education bonds"), proceeds from which are used to finance education of the young cohorts. The debt is repaid through a special income tax that is proportional to the past usage of the public education system (average number of years of schooling) and can be understood as a tax on aggregate human capital. Transformation of human capital into a liquid asset (education bond) could therefore improve economic performance of developing countries. Moreover, addition of assets linked to the human capital (education bonds) to individual portfolios can help to diversify risks and thus to improve the welfare.

However, the political costs of implementation of interconnected pension and public education systems may vary across developing countries. Despite the fact that the higher education is formally free in both in the Czech Republic and Russia, it is partially privately funded in the latter. Sidewise private financing of higher education through corruption channels in Russia in many estimates is comparable to the official public financing levels. In addition, the available statistics on the distribution of freshmen reveals that only about one half of the students were admitted to the publicly financed university slots in 2002 in Russia. In the Czech Republic, the situation is somehow different. Educational system is not perceived to be extremely corrupt, the number of private universities is limited, and the practice of charging tuition to students admitted to the state-funded schools is not as widespread as in Russia. Therefore, we speculate that the transition to the interconnected public educational and pension system – with public tertiary education be an explicit debt, and the human capital of a younger generation be an asset – would be politically less costly in Russia than in the Czech Republic.

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The Center for Economic Research and Graduate Education (CERGE) of Charles University is a research and educational institute with independent legal status. Its main purpose is to provide top quality Ph.D.level graduate education in theoretical and applied economics. Economic research, focused on the theoretical problems of economic transition and European integration, represents an important component of CERGE activities.

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