

Inwestycje w kapitał ludzki: optymalne podejście podatkowe

Investment in human capital: an optimal taxation approach

This article studies optimal financing of investment in human capital in a dynastic model with optimal taxation, heterogeneous abilities, asymmetric information and parental altruism. Economic theory suggests several margins of trade-offs between private and public financing. Primarily, investment in human capital generates positive externalities, causing most conventional decentralized equilibria to be characterized as under-investment and leaving room for public intervention in the form of public funding. However, taxes levied to finance this investment in education dampen incentives to acquire human capital. In addition to this main trade-off, there are other considerations. For example, public investment in children's human capital crowds out private investment. Further, freely available education is egalitarian (investment in human capital does not depend on accumulated physical capital), whereas private funding of human capital encourages greater inequality. Further, in a model where parents are altruistic towards children, wealthy parents may over-invest in low-ability children, whereas poor parents have no ability to invest in high-ability children, which reduces the externality embedded in human capital.

In line with these theoretical trade-offs, countries around the world are highly diverse in financing of education systems, with many countries not fully internalizing the externalities from incentives to investment in human capital (OECD, 2012). In low-income countries with private funding of education, human capital investment is very low. In high-income countries with private funding, debt delinquency is a policy concern.

For example, in the United States, the federal student loans program does not cover living expenses, which puts many students in the position of both accumulating student debt and being forced to work during the studies. In countries with public education finance system funded by general taxation, students pay no tuition costs, but investment in human capital is still more prevalent among youth from high-income households. Given that taxes are levied on low-income households as well, funding of education is implicitly a redistribution from low-income to high-income households. In a summary of the state-of-the-art, Stantcheva (2020) argues in favor of public funding if and only if high-ability agents do not benefit from it disproportionately. Since this review, new studies emerged showing paramount role of parental altruism in optimal policy design (e.g. Koeniger and Prat, 2018; Koeniger and Zanella, 2022). The main aim of this article is to study investment in human capital in the dynamic Mirrleesian model with parental altruism towards children's human capital.

I ask if social planner may improve social welfare by jointly determining optimal taxation and education policies. I further ask if centralized equilibrium is characterized by lower levels of inequality. I thus formulate two hypotheses.

Hypothesis 1:

There exist welfare-improving instruments incentivizing investment in human capital relative to decentralized equilibrium.

Hypothesis 2:

There exist instruments incentivizing the investment in human capital which reduce inequality relative to decentralized equilibrium.

My main contribution is the introduction of parental altruism toward children's education in the dynastic model with unobservable ability and labour effort. Empirical evidence – both micro and macro-economic – indicates that parents have a significant influence on the children's educational choices. Indeed, parental education spending makes up a significant part of education expenditure. Note that parental altruism impacts not only the decision about education expenditures but also own labour effort. I fill the gap in the existing literature concerning the optimal human capital investment by adding to the dynastic model the parental altruism toward children's education and I show that parents' altruism is relevant for normative inference. Stantcheva (2015) offers a theoretical framework for parental altruism in modelling optimal investment in human capital in the dynamic Mirrlees framework. Koeniger and Prat (2018) offer a theoretical and applied inquiry into ICL in the US, in a Mirrlees setup with dynasty structure policy for the US (contingent loans), but without parental altruism. Similarly, Koeniger and Zanella (2022) study transition from status quo to social optimum, but without altruism. I introduce to the dynastic model the parent's altruism toward children's education, show the theoretical implication comparing obtained results to Koeniger and Prat (2018) and calibrate the model to the US to propose the optimal education policy. I study steady states with and without two possible instruments: income-contingent loans and education subsidies. I provide theoretical results and simulations for the US economy.

In this article, **I compare two main policy instruments of subsidizing investment in human capital studied in the literature: education subsidies (ES) and income-contingent loans (ICL)**. ES are the government financial aid financed from general taxation, which most often covers the cost of tuition fees, in some cases also the living expenses, and, therefore, provides free access to higher education. They are effectively a redistribution tool because they eliminate barriers to acquiring education (within cohort redistribution). However, they also deepen inequality because taxes raised to finance education reduce welfare of all agents, while benefits accrue only to young agents (between cohort redistribution). In a static taxation model with the heterogeneity of innate ability, Bovenberg and Jacobs (2011) show that education subsidies are not an effective redistributive tool when education and innate ability exhibit complementarities.

This instrument effectively redistributes from high-ability working individuals to low-ability learning individuals. Benabou (2002) examines the impact of progressive income taxation and education subsidies on the level and distribution of income in an economy where agents live infinitely and are exposed to productivity shocks. In this setup, taxation efficiency is maximized with relatively high education subsidies, e.g. 10–15% of GDP for a broad range of plausible calibrations. Bohacek and Kapicka (2008) argue that, even if the social planner does not know the innate ability of agents, social optimum may consist of positive education subsidies. The overall welfare effects and changes in inequality depend on the efficiency gains from higher human capital investment and distortion introduced by taxation. ICL, meanwhile, keeps investment in human capital a private decision, but repayment of student loans is contingent on borrowers' current income. In

the UK, for example, student loan repayment programs stipulate income thresholds below which repayments are not required. Similar solutions exist in the US, though they are much less popular. Due to risky aspects of investment in human capital, ICL are good instruments for insuring against negative shocks. Arranging the reimbursement that depends on the borrower's current income is beneficial for young people, especially during unemployment or at the beginning of their careers. Existing macroeconomic literature indicates positive aspects of ICL (Gary-Bobo & Trannoy, 2015; Findeisen & Sachs, 2016; Stancheva, 2017). The main acquisition regarding the ICL is the fact that they can distort labour supply decisions. People may decide to work less to earn not more than the fixed threshold to avoid an "additional" tax on earnings. As a result, the cost of funding higher education has to be covered by the government. The existing empirical studies indicate that there are no labour supply responses associated with the change of the repayment scheme from mortgage-style to income-contingent (Herbst, 2018 for the US; Britton & Gruber, 2020 for the UK). The exception is a study of Chapman and Leigh (2009) for Australia, who find that graduates can adjust incomes in response to thresholds, but the effect is economically small - only around 0.3% of all those with ICL debt reduce little their income. My article analyses the impact of the introduction of ICL and ES on social welfare and inequality in the dynastic model with altruistic parents toward children's education. Introduction of altruistic parents changes the policy recommendation because the efficiency gains from investment in human capital are different in the agent model than in the dynastic model.

Key words: Education Finance System, Optimal Taxation with Human Capital, New Dynamic Public Finance, Altruistic Dynastic Model, Education Subsidies, Income Contingent Loans