Life in shackles? The quantitative implications of reforming the educational financing system

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Abstract

We conduct a quantitative analysis of educational financing systems in a stochastic overlapping generations model in which human capital can be enhanced through both formal schooling and learning-by-doing. The model is calibrated to the United States economy, including a stylized version of its student loan system. We find that moving to an income-contingent educational financing system, whereby transfers to students are financed from taxes on labor income, generates aggregate welfare gains. Such a system improves risk-sharing among college graduates and incentivizes individuals to obtain more education. These positive effects overturn the negative impact from labor supply distortions. Reforming the educational financing system towards income contingency, however, generates a considerable amount of transitional dynamics, so that welfare gains and losses are distributed unevenly across generations.

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1. Introduction

“. . . student loan systems [...] are often badly designed for an extended period of high unemployment. In contrast to the housing crash, the risk from student debt is not of a sudden explosion in losses but of a gradual financial suffocation. The pressure needs to be eased.”

[The Economist (October 29th, 2011)]

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Obtaining a college degree typically requires a large investment of time and money. In order to facilitate access to higher education most governments have instituted a student loan system of one kind or another. For example, in the United States there are four major federal sources of loans – subsidized and unsubsidized Stafford loans, the PLUS program, and the Perkins loans – as well as private sector loans (Avery and Turner, 2012). In the last two decades, student loans have become an increasingly important source of funds to finance a college education in the United States. Loan take up rates have more than doubled and the average size has even tripled (Kuhn and Rios-Rull, 2015). This is potentially worrisome, as the return to education is quite risky. One of the major components of this risk is the considerable amount of heterogeneity in earnings of successful college graduates. To deal with this, researchers have argued that income-based repayments should be preferred over standard student loans, as they at least partially insure individuals against the risk of a low return to a college education. Yet, Milton Friedman himself once famously compared income-based financing of education to partial slavery. Should this not be preferred to the gradual suffocation of debt?

In the present paper we assess the effects of reforming the educational financing system of the United States in a quantitative macroeconomic model with overlapping generations. We augment an otherwise standard version of this model to include important features of the human capital accumulation process. Human capital in our model can be accumulated via two channels: through formal education and learning on the job. Having completed high school, each individual chooses the optimal years of tertiary education given his or her talent for learning in school. In order to finance both tuition and consumption expenditure during the time of study, students receive transfers from the government. Once formal education is over, the individual joins the labor force and learns about his or her ability to accumulate human capital via the learning-by-doing mechanism. Following the pioneering work by Bewley (1977), Aiyagari (1994) and Huggett (1993, 1997), we assume that individuals experience uninsurable idiosyncratic labor productivity shocks, including the possibility of (temporary) unemployment. This implies that labor income is stochastic and that the type of educational financing system in place will influence the kind of financial distress that someone with a bad run in the labor market experiences.

We calibrate our model to the United States economy around the year 2010, including a stylized version of its student loan (SL) system. In this system the transfers that a student has received during the education phase constitute the debt that he or she has to redeem in fixed installments after graduation. We then consider three possible reforms: either a Comprehensive Tax (CT) system, a Graduate Tax (GT) system, or a Degree Tax (DT) system. The three alternative systems have in common that transfers to students are financed by means of taxes but they differ in the specification of the tax base. With a comprehensive tax all workers face an additional tax on their labor earnings collected through the progressive tax system. A graduate tax is a proportional tax that is only levied on educated individuals. Finally, a degree tax differentiates by the highest degree earned, thereby taking into account that individuals with more education incur larger costs. For each reform scenario we compute both the transitional and long-run effects of the policy change on micro- and macroeconomic outcomes and calculate welfare changes for current and future generations.

Our main findings are as follows. First, the reform from SL to CT produces a strong increase in long-run average educational attainment. Intuitively, since education expenditure under this system is financed from general tax revenue, each individual has to pay a share of the total cost of education regardless of which degree he or she actually pursues. This regressive redistribution substantially increases the return to a college education. In a reform from SL to GT the proportion of uneducated workers stays roughly constant. However, conditional on going to college, the average number of years of schooling goes up following the same logic as above. Finally, a degree tax minimizes the extent of redistribution between individuals of different education levels and a reform from SL to DT results in a moderate increase in average educational attainment.

Second, all three reforms produce significant long-run effects on the macroeconomy. When the student loan system is removed, the corresponding debts disappear which – taken in isolation – leads to an increase in the capital stock. The reduction in precautionary savings that results from a better provision of risk-sharing opportunities does not compensate for this, so that the interest rate falls and wages rise. Aggregate consumption increases by, respectively, 1.55% and 0.77% under the reforms CT and GT but stays more or less constant in the reform from SL to DT. Ex-ante welfare, by which we mean the level of welfare an individual expects before his or her talent for learning in school is revealed, increases in the long run under all reforms but the most for GT. When we look at ex-post welfare by type we see that the CT system, which holds all individuals liable for the costs of education, hurts the low ability types who do not participate in education themselves. In contrast, DT and GT increase steady-state welfare for everyone.

Third, in addition to the long-run effects, there exists a considerable amount of transitional dynamics in the model and it takes roughly half a century before the economy is close to its new steady state. The slow but realistic transition speed results from the fact that there are two slow-moving stocks in the model, namely physical and human capital (cf. Mankiw et al., 1992). We find considerable heterogeneity in welfare effects across different generations along the transition path. For generations that are already economically active at the time of the reform ex-ante welfare invariably falls. This result follows readily from the fact that they are – in a sense – paying the same bill twice. They must continue to pay off any existing student loan, but are also hit by a higher labor-income tax. Students are hurt as well, but to a lesser extent the younger they are (and thus the lower is the already incurred student loan). When aggregating welfare effects across all affected generations, it turns out that for all systems the gains of post-shock cohorts are large enough to compensate the losers from the policy reform so that aggregate welfare increases. However, the aggregate welfare effects are quite different in size, so that GT performs best and CT worst.
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