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Empirical Evidence Using GSOEP Data

3.1 Methodology and Data

Even if the *Hansen-Weisbrod-Pechman debate* does not provide a final result for the distributional impact, it is generally agreed, with regard to methodology, that a net-transfer calculation is appropriate (cf. Blaug (1982)). The idea of such a calculation is to break down the population of households into income groups and then to check whether each income group gains more or less in subsidy benefits than it pays in taxes in order to support higher education. The pattern of such net-transfers depends on (*a*) the distribution of the benefits from public higher education along with (*b*) the tax-incidence effect. The tax incidence, resulting from both, the comprehensive tax rate structure and the distribution of the tax base among income brackets, will determine the implicit share of the costs of higher-education subsidies being imposed on each income class. The distribution of the benefits depends particularly on the student-representation effect, that is, whether each income bracket contributes a *pro-rata* share of students to the higher-education system. Furthermore, but to a lesser extent, the distribution of the benefits depends on their structure, which is the incidence of the benefits within households with children enrolled in higher education.

If the benefits attributable to a particular income bracket, as determined by the share of students it contributes, differ from its implied share of the cost of subsidization, as determined by the tax incidence among income brackets, then a transfer among these income brackets has occurred.

It is interesting to note that almost all studies use a net-transfer calculation. The main advantage of this method is obviously its clarity. It is less difficult to explain the results from a net-transfer calculation to policymakers than to explain them a regression analysis,[1] what economists often use. The reason why we also use the net-transfer calculation is indeed the fact that

[1] With, for instance, some socio-economic variables as exogenous elements and the difference between received benefits and contributed taxes as endogenous variable.

it is the standard method to analyze this point. On the other hand, such a calculation is involved with serious problems concerning statistical inference. A main advantage of regression analysis is its (automatic) implementation of an inference check. A main disadvantage of many alternative methods is the missing attempt to statistical inference.

Hence, the main goal of the present empirical examination is twofold. First, it provides new evidence on a persistent controversy. Second, it proposes a procedure to consider the need for statistical accuracy. By doing so, the bootstrap is proposed as an advisable method for computing confidence intervals. More details on bootstrapping are provided in Subsection 3.1.5.

3.1.1 Tax Incidence

How much an income bracket contributes to finance higher-education subsidies depends on the tax system. By paying taxes, all households carry the costs of subsidization. If $X\%$ of the public budget is spent for subsidies, every household will therefore provide $X\%$ of his tax burden for (this) fiscal activity. Since the comprehensive tax burden should be considered (direct as well as indirect taxes) and there is no detailed data concerning the tax incidence, the assumption of a proportional tax incidence shall be made. This assumption implies that the regressivity of indirect taxation offsets the progressivity of direct taxation. Empirical work for both, the German and the U.S. case (Grüske (1978), Pechman (1986)) indicates that this assumption is an acceptable approximation of the incidence of the tax burden[2] and it is also used in the studies by Sturn and Wohlfahrt (1999) and Grüske (1994). As a consequence, each income bracket contributes a portion of the whole tax revenues that is exactly the portion of gross income that each income bracket receives.

3.1.2 The Distribution of the Benefits

The amount of benefits a population subgroup receives depends in particular on the student-representation effect and on the structure of the benefits, as noted above. In Germany, households with students receive in-kind benefits from the higher-education system (tuition-fee subsidy). Additionally, they are granted a child benefit or child allowances (the latter only if its relief exceeds their child benefit). If a household does not gain from income-splitting (e.g. due to a divorce), it has the opportunity to demand an allowance called *Haushaltsfreibetrag*. Furthermore, every household with children enrolled in the education system can ask for an education allowance (*Ausbildungsfreibetrag*) as well as for other benefits in tax laws, which are not considered in the present study.[3]

[2] For a further discussion see (Haveman, 1988, Ch. 5).

[3] In 1997, an amount of DM220 per month (Child benefit) was granted for the first and second child, DM300 for the third and DM350 for the fourth, fifth and