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Manos ANTONINIS
St. Antony's College and CSAE, University of Oxford, U.K.
and
Panos TSAKLOGLOU
Athens University of Economics and Business and IMOP, Greece

WHO BENEFITS FROM PUBLIC EDUCATION IN GREECE?

EVIDENCE AND POLICY IMPLICATIONS

Abstract

The paper examines the distributional impact of public education in Greece using the micro-data of the 1993/94 Household Budget Survey. The aggregate distributional impact of public education is found to be progressive although the incidence varies according to the level of education under examination. In-kind transfers of education services in the fields of primary and secondary education lead to a considerable decline in inequality, whereas the distributional impact of tertiary education transfers is found to be regressive. The overall progressivity of public education transfers declined between 1988 and 1994 and almost the entire decline is driven by changes in the progressivity of tertiary education transfers. The main policy implications of the findings are outlined in the concluding section.

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Address for correspondence:
Professor Panos Tsakloglou,
Department of International and European Economic Studies,
Athens University of Economics and Business,
76 Patission Str.,
Athens 10434
GREECE
e-mail: panos@aueb.gr

I. Introduction

Since the seminal contribution of S. Kuznets, the relationship between economic development and economic inequality has been investigated thoroughly. The most recent empirical evidence rejects the view that income distribution is bound to improve along the process of economic growth and emphasizes that idiosyncratic country-level effects may solely account for the inverted-U shape of the fitted curve.[1] Among these country-specific factors it is widely accepted that human capital is one of the main driving forces of changes in the distribution of income. Whether through the increase of individual productivity or the widening of opportunities, it has been observed that education is closely associated with inequality and that, *ceteris paribus*, the higher the educational level of the household the higher its standard of living.

Schematically, two stages of educational expansion in the process of development can be distinguished: before and after universal enrollment in basic (primary and secondary) education. In the earlier phase, the educational attainment of the population is low and so is average income. The policy of free provision of educational services by the state alleviates lower income groups from a major cost constraint and offers their offspring the possibility to improve their productivity and, hence, their income generating capabilities in the future. In this sense, free provision of education services by the state plays a progressively redistributive role, as resources are transferred from richer to poorer households whose children might not have joined school otherwise and would have sought employment in less rewarding, in the longer-term, activities. However, this process of declining inequality as a consequence of the provision of free education services is bound to slow down, as basic education reaches the entire population and private returns to it start to decline. At a second stage, competition shifts to access to the limited number of higher education places; an investment which appears to yield high private returns. The experience of almost all countries shows that in this race, members of richer households have a substantially higher probability than the rest of the population to enter the respective institutions.[2] The focus of public debate is expected to shift gradually toward the distributional impact of in-kind tertiary education services, even though the inertia caused by decades of public support may stifle attempts to question the status quo.

Greece stands at these crossroads nowadays. Access to primary as well as secondary education are not subject to quantitative constraints, but demand exceeds the limited supply of tertiary education places by a considerable margin. Private returns to university education are still very high and, therefore, the administrative constraints in the allocation of places in tertiary education institutions, in combination with the full subsidization of tertiary education have direct distributional consequences, which are expected to become increasingly pressing in the future.[3]

In an earlier paper we derived quantitative estimates of the distributional impact of public education in Greece using the data of the 1987/88 Household Budget Survey (HBS).[4] The results confirmed the highly progressive nature of the in-kind transfers at the primary and secondary levels of education, while the impact of tertiary education transfers was found to be neutral. The present study repeats this benefit incidence analysis using the more recent and far more detailed micro-data of the 1993/94 HBS, which corrects for several ambiguities of our previous work. The remainder of the paper is organized as follows. The next Section presents a short overview of the Greek education system. Section III is concerned with methodological issues, while Section IV presents the main empirical results of the paper. Section V assesses the changes that took place in the six-year period separating the two surveys (1988-1994) and Section VI concludes the paper discussing the possible caveats and policy implications of the findings.

II. A short overview of the Greek education system

The Greek education system has a compulsory 9-year basic education cycle, consisting of primary (6 years) and lower secondary (3 years) education. Upper secondary education is not compulsory and is divided into a general/comprehensive and a technical strand. Graduation from general upper secondary schools enables students to take part in general examinations leading to higher education. Graduates of technical upper secondary schools can only enter a part of higher education, technological education institutes (TEI), which generally hold lower prestige than universities (AEI). According to the Greek constitution, education is provided free of charge at all levels. The formal private education sector is small and in 1993/94 accounted for 7.3% and 6.2% of the overall number of primary and secondary education enrollments, respectively. Further, the constitution prohibits the operation of private tertiary education institutions. Nevertheless, in recent years the high demand for tertiary education has gradually led to some sort of indirect privatization of parts of the Greek post-compulsory education system. The process is the following:

Every year the Ministry of Education decides about the number of places that will be allocated in each department of each higher education institution. On the basis of this quantity rationing, students fill the places, after participating in competitive entry examinations. In order to satisfy the quest for success in these examinations, a parallel educational system has been developed, providing private tuition to tertiary education candidates. The inputs to this system are supplied by two sources. Firstly, teachers, whose earnings are close to the bottom tail of the civil service pay scales (controlling for their qualifications), found in this system a suitable way to supplement their incomes. Secondly, university graduates from humanities and science faculties, whose appointment to public school teaching posts was until recently guaranteed by the Ministry of Education, but who could not wait for the end of the corresponding inordinately long waiting period (sometimes

longer than fifteen years), organize themselves in cram schools offering specifically designed courses for the university entry examinations. Inevitably, this structure was bound to have a significant impact on the probabilities of children with different socioeconomic backgrounds to succeed in the general examinations leading to tertiary education.

Several private education institutions operate at the post-secondary education level but the degrees they offer are not officially recognized as equivalent to those of public tertiary education institutions, nor are they perceived as such by the general public. Yet, in the past few years, as places in tertiary education institutions have increased only slightly, demand for places in the private post-secondary Vocational Training Institutes (IEK) has stepped up. Some of these institutes were founded as annexes of or in association with foreign higher education institutions (mainly newly established British universities) and charge quite substantial fees. After one or two years of preparatory attendance, IEK students continue their studies abroad, thus perpetuating and strengthening a long tradition of high numbers of Greek students abroad. According to UNESCO, in the early 1990s over 40,000 Greeks were studying abroad; the ratio of students studying abroad to students studying in Greece is comparable only with countries whose tertiary education system is still developing.[5] Although the absence of fees for undergraduate courses facilitates the mobility of Greek students within the European Union, the significant difference in the cost of living between Greece and most of the «host» countries implies a substantial out-of-pocket burden for the households which decide to send their offspring to study abroad. In short, the idea of free education guaranteeing equal opportunities in access to tertiary education to everybody appears contestable in practice while, at the same time, all the available evidence suggests a relatively high willingness-to-pay for education services.

Three further observations are worth-mentioning regarding inequalities preceding tertiary education. Firstly, technical secondary education attracts disproportionate numbers of students from lower income strata, whose access to universities is essentially blocked. This distinction serves to sort the student population and, thus, alleviate the pressure on the overburdened university entry examinations system. Secondly, most of the students who do not stay in the education system after the completion of its compulsory stages are from poor households. Thirdly, the available information shows that completion of the compulsory levels of education is far from universal and the dropout rates are significantly higher in the poorest regions and socioeconomic strata.

Even though the main purpose of public education may not be the redistribution of resources from the better-off to the worse-off strata of the population, its potential for redistribution is very significant. For example, in 1994 public education accounted for 4.16% of GDP.[6] The bulk of current public education spending, relating to teachers' salaries, textbooks and scholarships, is managed by the Ministry of Education, while a smaller amount, covering schools maintenance, rents and transportation costs, is administered by the local authorities. Investment expenditure is managed through the Public Investment

Budget and exhibits a fluctuating pattern. For this reason, instead of the aggregate 1994 investment figure, we use a moving average of the investment level of the ten years preceding this year, thus, implicitly assuming that capital investments in education depreciate constantly within a ten-year period.

Table 1 provides an overview of the Greek education system in 1993/94 in terms of numbers of students (both in public and private schools), total expenditure (distinguished between current and investment expenditure) stated in current 1994 million drachmas[7] and average yearly cost per student attending a public school (in current 1994 drachmas) for each level of the system (primary, secondary, technological tertiary and university tertiary). In order to put the latter figures in a comparative perspective, it should be noted that they correspond to 25.3%, 24.8%, 93.8% and 53.1%, respectively, of the average yearly private consumption expenditure of the population. The analysis of the distributional impact of public education spending is based on the information reported in this table.

3. Data and methodology

The paper utilizes the micro-data of a HBS carried out by the National Statistical Service of Greece (NSSG) between November 1993 and October 1994. The survey covers all the private (non-institutional) households of the country and its sampling fraction is 2/1,000 (around 6,700 households or 20,000 individuals). For the purposes of the paper, the welfare level of each household is approximated by its level of consumption expenditure. This choice was dictated by two factors. Firstly, current consumption is usually considered a better indicator of the long-term welfare level of economic agents than current income and the use of consumption expenditure data in the framework of the present study can help in side-stepping problems arising from comparisons over different phases of the life-cycle. Secondly, according to the NSSG, the consumption expenditure data of the HBS are considered as more reliable than the corresponding income data.

The concept of consumption expenditure used in our analysis includes, apart from the value of purchased goods and services, consumption of own production, consumption of income in kind and imputed rent for owner-occupied accommodation evaluated at market prices. They were expressed in constant mid-1994 prices in order to remove the impact of inflation (9.8% from the beginning to the end of the survey). Finally, the value of cars purchased during the period of the survey was subtracted from the concept of consumption expenditure and replaced by the value of imputed car services, estimated using hedonic regression techniques, for all the households which owned cars.

In accordance with the relevant literature, the unit of analysis in the main part of the paper is the household and the distributions used are distributions of equivalent consumption expenditure per household.[8] The equivalence scales used are the so called «modified OECD scales» which assign weights of 1.0 to the household head, 0.5 to each of the remaining

TABLE 1

NUMBER OF STUDENTS AND COST STRUCTURE OF THE GREEK PUBLIC EDUCATION SYSTEM, 1993-94

	Students	%	Current spending*		Investment spending**	Total spending*	Average spending per student	
			Ministry of Education	Ministry of Interior			Current	Total
● PRIMARY EDUCATION								
All schools	731,500	100.0						
Public schools	678,145	92.7	168,312	26,052	46,393	240,757	286,111	355,023
Private schools	53,355	7.3						
● SECONDARY EDUCATION								
All schools	872,235	100.0						
Public schools	817,848	93.8	205,442	47,926	31,401	284,769	309,798	348,193
Private schools	54,387	6.2						
● TERTIARY EDUCATION								
All institutions	162,705	100.0						
Universities (AEI)	107,968	66.4	104,107		37,869	141,976	964,239	1,314,982
Technological Institutes (TEI)	54,737	33.6	32,745		7,984	40,729	598,224	744,085

* In millions of current drachmas

** Average spending of the ten preceding years in millions of 1994 drachmas

Sources: Ministry of Finance, National Statistical Service of Greece - Education Department

adults and 0.3 to each child (person aged up to 13) in the household.[9] Division of the total expenditure of each household with its equivalence scale yields its equivalent consumption expenditure, which is used as an indicator of the household's welfare level.

The survey provides information on the level of education each household member is currently attending. Although there is no explicit information on whether those who participate in the education system attend public or private schools, this information can be extracted implicitly, since the HBS records information on expenditures for private education fees.[10]

In the first part of the empirical analysis, the transfers are added to the monthly consumption expenditure of the households of the students; thus, implicitly assuming that the benefits are shared by all household members or, alternatively, that if the relevant costs were not born by the state they would have to be born by the household.[11] This is not an unrealistic assumption since family links are strong in Greece and intra-family transfers are common. A problem arises in this case concerning around 45% of the tertiary education students (and a few secondary education students) in our sample, who study in cities other than the cities where their parents live and form their own households or, in very few cases, live in relatives' households.[12] Due to inadequate information, our methodology implies that the welfare level (equivalent consumption expenditure) of these students is determined by the transfers they receive from their families - in an attempt to equalize the welfare level of all family members - but the benefits of public education transfers are captured entirely by the students themselves and are not shared with the rest of their families. In the second part of the empirical analysis it is assumed that these transfers benefit only the students who receive them. Therefore, they are added to the equivalent consumption expenditure of the students and comparisons are made not between household but between members of particular age groups.[13]

In order to compare the level of inequality before and after the public transfers we use five indices of inequality: Gini, Atkinson (for e=0.5 and e=2) and the two Theil indices. These indices satisfy the basic axioms of inequality measurement (symmetry, mean-independence, population-independence and the principle of transfers).[14] The Atkinson index (e=2) and the second Theil index are relatively more sensitive to transfers close to the bottom of the distribution, the first Theil index and the Atkinson index (e=0.5) more sensitive to transfers close to the top of the distribution and the Gini index to transfers close to the middle of the distribution. Therefore, the combined use of these indices satisfies a wide range of tastes regarding the responsiveness of an index to different types of transfers.

4. Empirical results

The results concerning the distributional impact of public education in Greece in 1994 are reported in Tables 2-5. These tables should be read in the following way. Each of them is

split in two panels. The left panel, consisting of five columns, reports the value of public education in-kind transfers as a proportion of the mean consumption expenditure (which is reported in the first line) received by five groups of equal size (quintiles). The quintiles are formed when all the households in the sample are ranked from the least well-off to the most well-off according to their equivalent consumption expenditures. Likewise, the first line of the right panel, consisting of the remaining five columns, reports estimates of the five aforementioned indices of inequality of the distribution of equivalent consumption expenditure before the transfers while the proportionate changes after the in-kind transfers of education services are taken into account are reported in the following lines. A negative (positive) figure in these lines denotes a decline (increase) in aggregate inequality after the impact of the transfers is accounted for. The first line refers to the initial distribution before these transfers are introduced, while the second line refers to the distribution of consumption expenditure after all the relevant transfers accruing to the households are estimated and added. In the next three lines the total amount of transfers reported in the second line is disaggregated into transfers for primary, secondary and tertiary education services, respectively, and the distributional impact of the transfers at each level of the education system is analyzed separately. Likewise, the last two lines disaggregate the effect of tertiary education transfers by providing an analysis of the distributional impact of these transfers to households with members studying in technological institutes (TEI) and universities (AEI), respectively.

Table 2 provides estimates of the distributional impact of public education transfers on the total sample of households included in the HBS (6,702 households). On aggregate, these transfers appear to be quite substantial. In 1994 the value of the average monthly transfer of in-kind education services received by the households in the survey was equal to 5.75% of the average consumption expenditure, though the distribution of this aggregate transfer varies considerably across quintiles : it was as high as 9.4% of the mean pre-transfer consumption expenditure of the poorest quintile and as low as 2.9% in the case of the richest quintile. As a result of these transfers, inequality in the distribution of equivalent consumption expenditure declines between 0.4% and 3.7%, according to the index used. Therefore, it can be claimed that, at least from a static point of view, the Greek public education system reduces inequality. However, the next three lines of Table 2 suggest that, as is often the case, the state support to the three bottom quintiles is channeled primarily through primary and secondary education whereas the two top quintiles receive larger transfers through secondary and tertiary education. In terms of aggregate inequality, the in-kind public transfers in the cases of primary and secondary education have an equalizing effect, each resulting in declines of inequality between 1.0% and 2.1%. On the contrary, tertiary education transfers increase the values of the inequality indices by 0.5%-1.8%.

From a slightly different point of view, Figure 1 reports the relative changes in the equivalent consumption expenditure shares of population deciles after the inclusion of public transfers

TABLE 2

DISTRIBUTIONAL IMPACT OF PUBLIC EDUCATION IN-KIND TRANSFERS: GREECE 1994 - ALL HOUSEHOLDS (N=6702)

Distribution	Quintile					Index of inequality				
	Bottom	Lower middle	Middle	Upper middle	Top	Gini	Atkinson (e=0.5)	Atkinson (e=2)	1st Theil	2nd Theil
Initial distribution (pre-transfer) (mean consumption expenditure in 1994 drachmas)	124206	214487	290934	381437	600126	0.3063	0.0754	0.2743	0.1566	0.1574
	Mean education transfer as share of mean consumption expenditure, %					Change of inequality after the addition of the education transfers, %				
Final distribution (post-transfer)	9.36	9.32	7.25	5.88	2.92	-1.53	-2.92	-0.36	-3.70	-2.16
Initial distribution plus primary transfers	4.38	2.81	2.53	1.71	0.86	-1.01	-1.96	-1.32	-2.14	-1.90
Initial distribution plus secondary transfers	3.53	4.03	2.57	2.02	1.07	-1.01	-1.80	-0.86	-2.05	-1.64
Initial distribution plus tertiary transfers	1.45	2.48	2.15	2.14	0.99	+0.62	+0.93	+1.82	+0.51	+1.52
Initial distribution plus TEI* transfers	0.29	0.69	0.60	0.47	0.24	-0.07	0.00	+0.29	-0.06	+0.13
Initial distribution plus AEI** transfers	1.15	1.78	1.54	1.67	0.75	+0.62	+0.93	+1.54	+0.57	+1.33

*   TEI: Technological Institutes
**   AEI: Universities

FIG.1.- Relative differences in consumption decile shares after the education transfers
All households (N=6702)

All education transfers

Transfers by education level

Transfers by tertiary education type
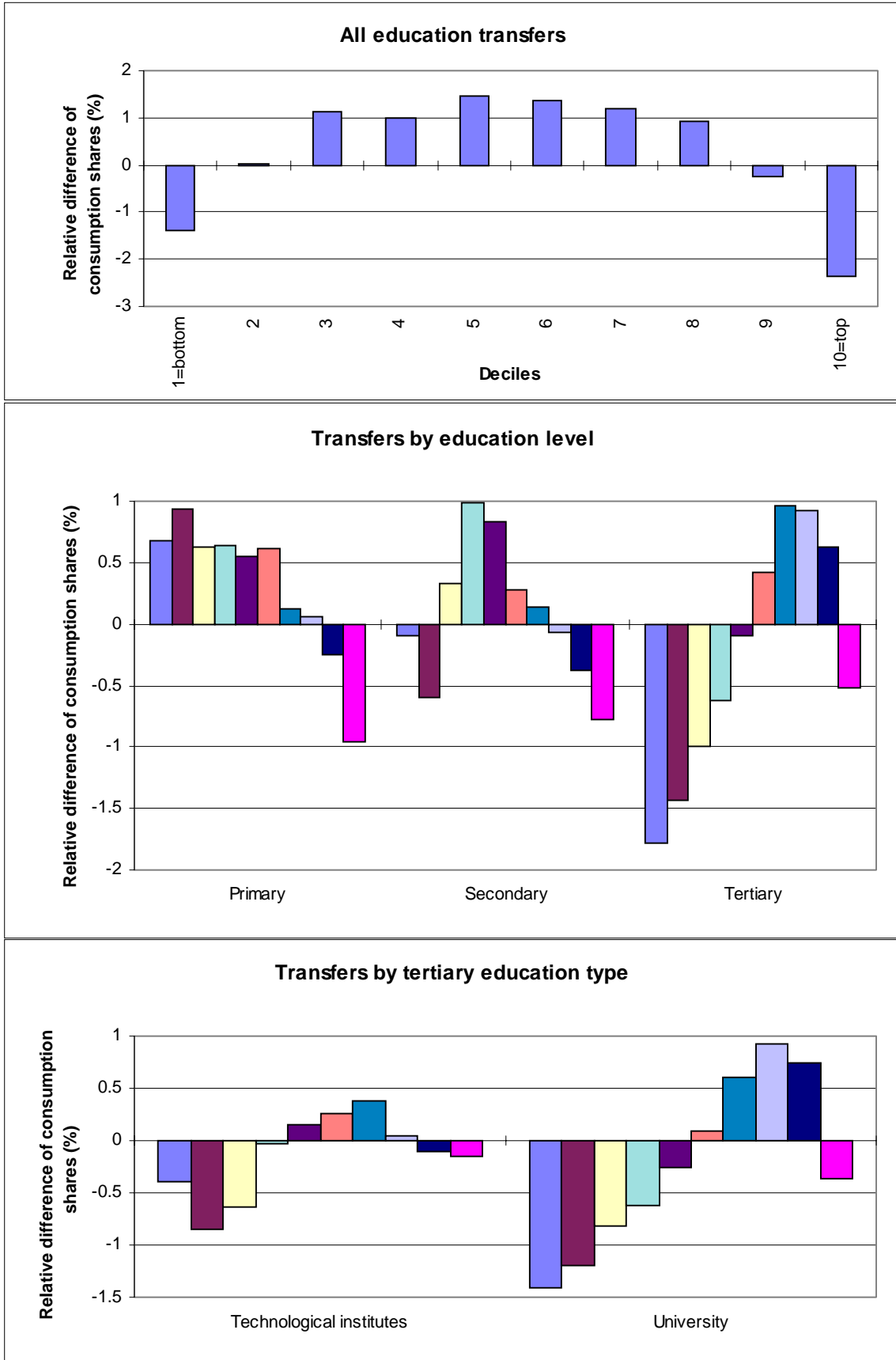
(and the resulting household re-rankings). The upper panel shows the effects of all the transfers taken together, the middle panel the effects of transfers at each level of the education system separately and the lower panel disaggregates the effects of tertiary education transfers to AEI and TEI students. After adding the sum of all education transfers, the shares of the top two as well as the bottom decile decline, while those of the middle and, especially, the upper-middle deciles rise. As a result, the corresponding Lorenz curves intersect close to the bottom of the distribution.[15]

Furthermore, even though the aggregate distributional impact of primary and secondary education transfers reported in Table 2 look fairly similar, the second panel of Figure 1 paints a slightly different picture. This is because in the case of primary education the shares of the bottom eight deciles rise after the transfers are taken into account at the expense of the top two deciles, whereas in the case of secondary education the post-transfer shares of the top three as well as the bottom two deciles are lower than their pre-transfer shares. Therefore, the post-transfer dominates the pre-transfer Lorenz curve in the case of primary education transfers, whereas the corresponding curves intersect in the case of secondary education transfers. On the contrary, as a result of tertiary education transfers the shares of the bottom five as well as the top decile decline at the expense of deciles 6-9; another case of Lorenz curves' intersection but, this time, close to the top of the distribution.

As noted earlier, tertiary education students can be distinguished into university (AEI) and technological institute (TEI) students. The latter receive lower in-kind transfers and are also more likely to come from lower socioeconomic strata, as the entry barriers are lower. In the last two lines of Table 2 it is evident that the distributional impact of transfers to TEI students is very mildly regressive, whereas the impact of transfers to AEI students is more clearly regressive (inequality rises by 0.6%-1.5%). Moreover, the lower panel of Figure 1 shows that after the transfers to households with TEI students the shares of the bottom four and the top two deciles decline whereas those of deciles 5-8 rise, but these changes are relatively small. After the transfers to households with AEI students the shares of quintiles 6-9 rise at the expense of the rest of the population and the corresponding changes are far larger. In both cases the pre- and post-transfer Lorenz curves intersect; in the case of the TEI transfers in the seventh decile, in the case of the AEI transfers in the ninth decile.

Although the results of Table 2 and Figure 1 are very informative, they may be a little misleading because the sample used there for the examination of the distributional impact of in-kind public education transfers includes several households which, almost by definition, are very unlikely to benefit directly from public education (elderly households, childless couples, etc.). Hence, we decided to supplement the analysis using two alternative approaches.

In the first approach we isolated the cohorts that are most likely to have members participating in the education system according to the age of the household head. More specifically, in this case the sample consists of all the households with heads aged 25-60 (3952 households) and includes the overwhelming majority of households with members in primary and secondary education (but only about 60% of those with members in tertiary education, as most of the remaining tertiary education students live in households headed by themselves; therefore, results for tertiary education transfers recipients are not representative in this sub-sample).

The corresponding results are presented in Table 3 and Figure 2. On average, as a result of the improved focusing on the transfer recipients, the value of the in-kind transfers to these households is equivalent to 6.7% of the value of their consumption expenditure. The upper panel of Figure 2 suggests that the post-transfer dominates the pre-transfer Lorenz curve, since the shares of the bottom seven deciles rise at the expense of the shares of the top three deciles. Correspondingly, all the indices record considerable declines in aggregate inequality. In proportional terms these declines are lower when the Gini index is used (4.9%) instead of the rest of the indices used in this paper that are more sensitive to changes in the tails of the distribution (8.3-9.7%). In absolute terms the value of in-kind transfers of education services decline monotonically as we move from the poorest to the richest quintile of the distribution at both the primary and secondary levels. This is a result of two forces. Firstly, on average, poorer households tend to have more children.[16] Secondly, private education has a very high income elasticity of demand. In fact, 94% (81%) of the primary (secondary) education students who attend private schools come from households belonging to the two highest quintiles – particularly the top – while no member of a household belonging to the bottom quintile attends a private school. The evidence of the middle panel of Figure 2 implies that in both cases the post-transfer Lorenz curve dominates the corresponding pre-transfer curve and the inequality indices record substantial declines in aggregate inequality in the relevant parts of Table 3.

In the second approach we isolated the households with members who could participate in the education system; that is, in this case the sample consists of all households with members aged 6-24 (2785 households). The age limit of 24 was selected for two reasons. Firstly, a considerable proportion of tertiary education students start their studies not in the age of 18 but in the age of 19 or 20. Secondly, since there are virtually no time limits for the period of studies in tertiary education institutions in Greece, the majority of students do not complete their studies during the normal period (3-6 years, depending on the type of institution). Indeed, our data show a sharp drop in the tertiary education participation rate only after the age of 24. In this case almost all the potential current beneficiaries of public education are included in the sample, but the overwhelming majority of the non-beneficiaries is left out of the picture.

TABLE 3

DISTRIBUTIONAL IMPACT OF PUBLIC EDUCATION IN-KIND TRANSFERS: GREECE 1994 - HOUSEHOLDS WITH HEADS AGED 25-60

(N=3952)

Distribution	Quintile					Index of inequality				
	Bottom	Lower middle	Middle	Upper middle	Top	Gini	Atkinson (e=0.5)	Atkinson (e=2)	1st Theil	2nd Theil
Initial distribution (pre-transfer) (mean consumption expenditure in 1994 drachmas)	185240	284872	350860	443266	661299	0.2863	0.0659	0.2392	0.1371	0.1360
	Mean education transfer as share of mean consumption expenditure, %					Change of inequality after the addition of the education transfers, %				
Final distribution (post-transfer)	14.98	10.19	8.42	5.54	2.85	-4.92	-9.40	-8.28	-9.70	-9.63
Initial distribution plus primary transfers	6.33	3.99	2.93	2.22	0.92	-2.38	-4.75	-4.87	-4.73	-5.10
Initial distribution plus secondary transfers	7.08	4.55	2.95	2.18	1.17	-2.44	-4.58	-3.96	-4.65	-4.75
Initial distribution plus tertiary transfers	1.53	1.65	2.54	1.14	0.76	-0.03	-0.15	+0.63	-0.44	+0.15
Initial distribution plus TEI* transfers	0.48	0.68	0.64	0.24	0.21	-0.17	-0.30	-0.04	-0.36	-0.22
Initial distribution plus AEI** transfers	1.07	0.97	1.90	0.90	0.54	+0.14	+0.15	+0.71	-0.07	+0.37

*   TEI: Technological Institutes
**   AEI: Universities

FIG.2.- Relative differences in consumption decile shares after the education transfers
Households with heads aged 25-60 (N=3952)
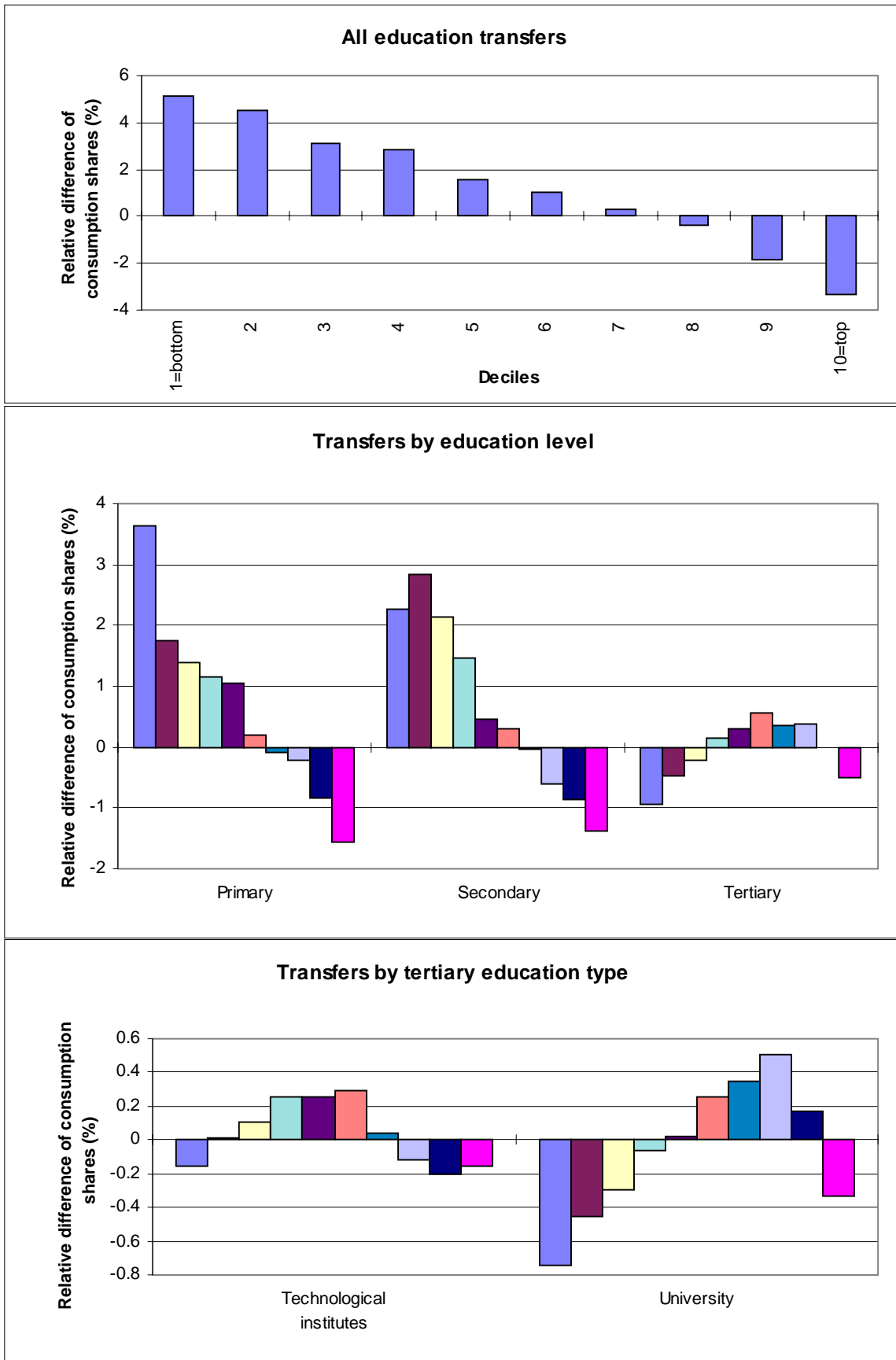
Results are reported in Table 4 and Figure 3. On average, the value of all in-kind education transfers to the households in the sample are equivalent to 10.5% of the value of their consumption expenditure. Once again, the distributional impact of transfers in the fields of primary and secondary education is highly progressive. However, as a result of transfers in the field of tertiary education, the shares of the four lowest deciles as well as that of the top decile decline, while those of deciles 5-9 rise, while aggregate inequality rises by 1.2%-3.7%. Moreover, the results reported in the last two lines of Table 4 as well as the lower panel of Figure 3 suggest that the aggregation of transfers to tertiary education students is a little misleading. Transfers to households with members attending technological institutes are relatively evenly distributed to all quintiles but the bottom, they lead to declines in the shares of the bottom three and the top three deciles and their distributional impact is very mildly regressive. Transfers to households with members studying in universities have a far stronger negative redistributive impact. They are directed disproportionately towards the upper middle part of the distribution, result in increases in the shares of deciles 6-9 and, *ceteris paribus*, bring about an increase in inequality between 1.2% and 3.2%.[17]

In the final part of this section, instead of assuming that the benefits of public education are shared by all household members, it is assumed that these benefits are captured exclusively by the students themselves. The distributions used in Table 5 are distributions of persons rather than households and comparisons of the levels of inequality before and after the transfers are made for members of particular age groups, defined in such a way as to include the potential beneficiaries of each educational level (6-11, 12-17 and 18-24 for primary, secondary and tertiary education, respectively). More specifically, it is assumed that the pre-transfer welfare level of each member of these groups is determined by his/her level of equivalent consumption expenditure while the post-transfer welfare level is determined by his/her equivalent consumption expenditure plus the value of the public transfer in the corresponding education level, if he or she is participating.

The results of Table 5 strengthen the results of the other tables of this section. Primary and, to a lesser extent, secondary education transfers have a strongly equalizing impact, as suggested from all indices. In the case of secondary education, the mean transfers to the members of the bottom and top quintiles are lower than the mean transfers received by the members of the three middle quintiles. In the case of the bottom quintile this difference should be attributed to the fact that fewer members of the quintile participate in the non-compulsory upper secondary education whereas in the case of the top quintile the difference is due to the fact that proportionally more members of this quintile enroll in private education institutions. Tertiary education transfers appear directed primarily towards the top three quintiles. Due to intersecting Lorenz curves, the overall impact of these transfers appears to be slightly ambiguous. The first Theil index which is particularly sensitive to transfers at the top of the distribution registers a marginal decline in inequality after the transfers are taken into account, whereas all the other indices record an increase. In fact, in

TABLE 4

DISTRIBUTIONAL IMPACT OF PUBLIC EDUCATION IN-KIND TRANSFERS: GREECE 1994 - HOUSEHOLDS WITH MEMBERS AGED 6-24

(N=2785)

Distribution	Quintile					Index of inequality				
	Bottom	Lower middle	Middle	Upper middle	Top	Gini	Atkinson (e=0.5)	Atkinson (e=2)	1st Theil	2nd Theil
Initial distribution (pre-transfer) (mean consumption expenditure in 1994 drachmas)	203327	290840	368092	458133	713077	0.2743	0.0603	0.2243	0.1248	0.1246
	Mean education transfer as share of mean consumption expenditure, %					Change of inequality after the addition of the education transfers, %				
Final distribution (post-transfer)	20.11	15.27	12.15	9.57	5.55	-6.05	-11.8	-9.94	-12.42	-11.88
Initial distribution plus primary transfers	8.18	5.11	4.23	3.03	1.72	-3.17	-6.43	-6.69	-6.37	-6.91
Initial distribution plus secondary transfers	8.71	6.53	4.18	3.44	2.14	-3.21	-5.99	-5.16	-6.09	-6.17
Initial distribution plus tertiary transfers	3.22	3.63	3.74	3.09	1.69	+1.13	+2.00	+3.66	+1.20	+2.89
Initial distribution plus TEI* transfers	0.76	1.15	0.87	0.75	0.42	0.00	+0.17	+0.53	0.00	+0.24
Initial distribution plus AEI** transfers	2.45	2.48	2.87	2.35	1.28	+1.20	+2.00	+3.21	+1.36	+2.73

*   TEI: Technological Institutes
**   AEI: Universities

FIG.3.- Relative differences in consumption decile shares after the education transfers
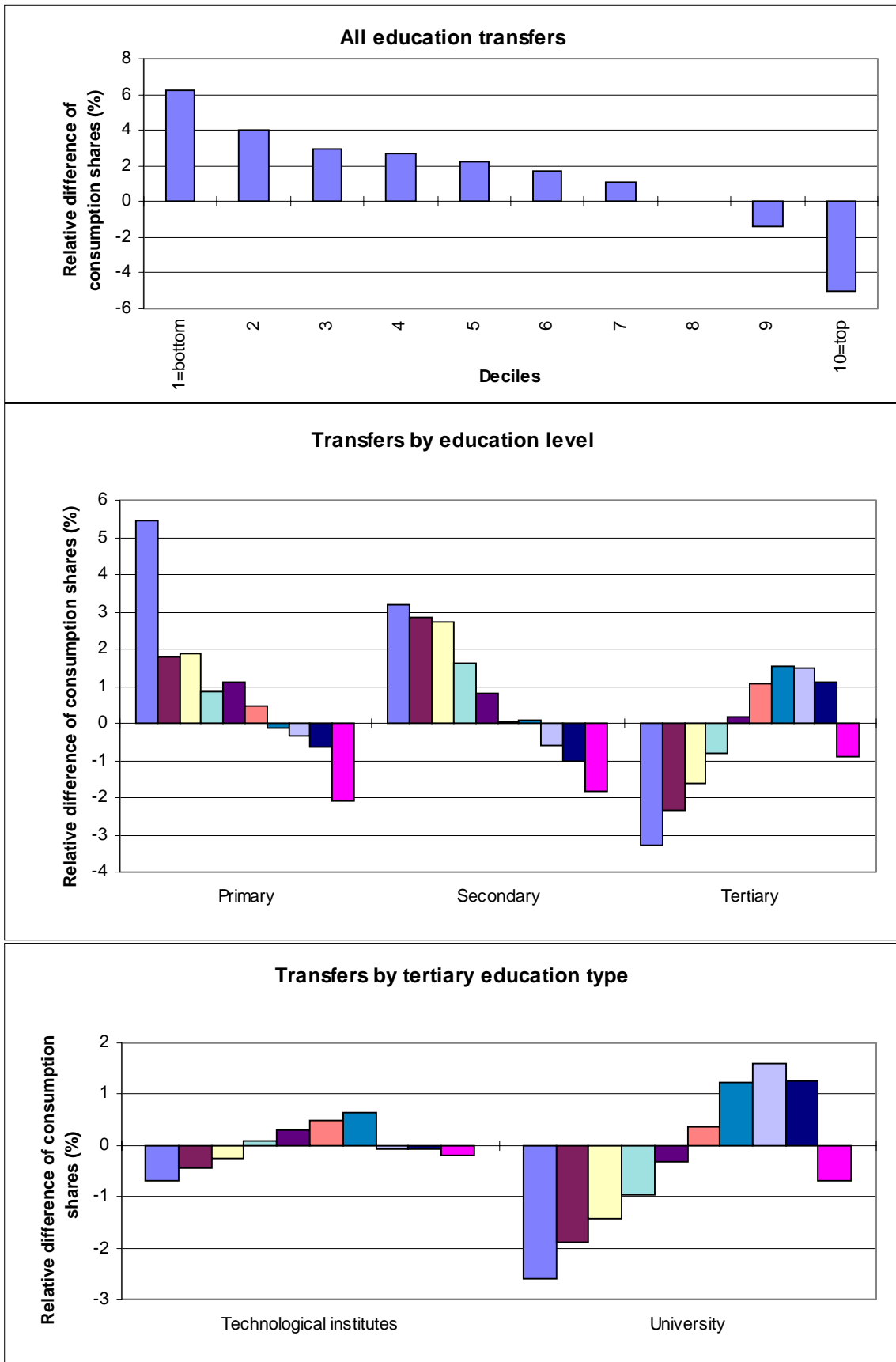Households with members aged 6-24 (N=2785)

TABLE 5

DISTRIBUTIONAL IMPACT OF PUBLIC EDUCATION IN-KIND TRANSFERS: GREECE 1994 - DISTRIBUTIONS OF PERSONS IN PARTICULAR AGE BRACKETS

Distribution	Quintile					Index of inequality				
	Bottom	Lower middle	Middle	Upper middle	Top	Gini	Atkinson (e=0.5)	Atkinson (e=2)	1st Theil	2nd Theil
• INITIAL DISTRIBUTION OF PERSONS AGED 6-11 (N=1338)										
Mean equivalent consumption expenditure in drachmas	77484	124737	161378	211230	332067	0.2799	0.0628	0.2386	0.1281	0.1316
	Mean education transfer as share of mean consumption expenditure, %					Change of inequality after the addition of the education transfers, %				
Plus primary education transfers	37.10	22.53	17.60	13.29	7.13	-6.22	-12.42	-13.08	-12.41	-13.22
• INITIAL DISTRIBUTION OF PERSONS AGED 12-17 (N=1641)										
Mean equivalent consumption expenditure in drachmas	79452	118746	154684	202896	331404	0.2820	0.0637	0.2368	0.1318	0.1318
	Mean education transfer as share of mean consumption expenditure, %					Change of inequality after the addition of the education transfers, %				
Plus secondary education transfers	28.90	22.38	17.11	12.84	7.34	-4.89	-9.26	-7.47	-9.41	-9.41
• INITIAL DISTRIBUTION OF PERSONS AGED 18-24 (N=1628)										
Mean equivalent consumption expenditure in drachmas	83164	125451	160921	205613	330357	0.2719	0.0599	0.2209	0.1253	0.1229
	Mean education transfer as share of mean consumption expenditure, %					Change of inequality after the addition of the education transfers, %				
Plus tertiary education transfers	13.64	16.64	16.03	13.36	7.68	+0.96	+1.67	+5.43	-0.08	+3.25
Plus TEI transfers	3.51	5.07	4.61	3.11	2.19	-0.07	+0.17	+0.95	-0.32	+0.33
Plus AEI transfers	10.13	11.57	11.58	10.25	5.49	+1.62	+2.50	+5.25	+1.04	+3.82

the case of the Atkinson index (e=2) which is relatively more sensitive to transfers close to the bottom of the distribution, the recorded rise in post-transfer inequality is quite substantial (5.4%).

5. Changes in the distributional impact of public education between 1988 and 1994

As noted above, in our earlier work we analyzed the distributional impact of public education in Greece using the data of a HBS carried out in 1988. Between 1988 and 1994 there were no important institutional changes affecting education. However, changes did take place at the demographic, fiscal and operational levels.

Regarding demographics, as a consequence of a sharp decline in the birth rate in the 1980s, between 1988 and 1994 the number of students enrolled in public primary education fell from a little less than a million to a little less than seven hundred thousands. Under these circumstances, the cost per primary school student could only rise since schools were built for a particular capacity and their operational costs could not change substantially in the short run. Most probably this decline led to improvements in the quality of primary education, since it contributed to a substantial improvement in the teacher-pupil ratio. No corresponding decline was observed in the number of secondary education enrollments between 1988 and 1994, partly because of an increase in the rate of post-compulsory secondary education enrollments and partly because the low birth rate cohort had not yet reached the secondary education age in 1994. As a result of these factors, although in 1988 the mean transfer to a primary public education student was only 70% of that to a secondary public education student, by 1994 the two transfers were about the same.

From the fiscal point of view, despite the decline in the total number of public education students, the share of public education in GDP rose from 3.69% to 4.16% between 1988 and 1994[18], due, primarily, to increases in investment rather than current expenditures. The combined effect of lower student numbers and higher public spending in education led to a substantial increase in the value of the mean public transfer of in-kind education services at the primary and the tertiary levels of education, despite the meager growth in GDP per capita that was recorded between 1988 and 1994. On the contrary, spending per secondary public education student declined marginally between 1988 and 1994 in real terms.

At the operational level, there was a small but noticeable increase in demand for tertiary education between 1988 and 1994. For example, despite the fact that the size of the age cohort of tertiary education candidates was slightly smaller in 1994 than in 1988, the number of candidates in 1994 (154,116) was substantially higher than in 1988 (132,727), while the number of places available for allocation using the *numerus clausus* system remained constant (42,795 against 42,700). As a result, the ratio of candidates to tertiary education (AEI and TEI) places available rose from 3.10 in 1988 to 3.61 in 1994, while the ratio of candidates for each place in a university rose from 5.78 to 7.01.[19] The increased

demand for post-secondary education qualifications was satisfied, at least partly, by the Vocational Training Institutes (IEK, private) and Vocational Training Centers (KEK, public) which were established in large numbers in the late 1980s and the early 1990s – many of them with direct or indirect financial support from the European Union.[20]

Our attempt to compare the distributional impact of public education in 1988 and 1994 was hindered by two factors. Firstly, unlike the 1994 HBS, in the 1988 HBS there is no information regarding the education status of persons aged below 14. As a result, in our earlier distributional incidence analysis we assumed that all population members up to that age were attending the school level corresponding to their age. While this poses no problems regarding primary education, as primary school attendance is almost universal, this cannot be maintained for lower secondary school students, where dropout rates can be relatively high and attributable to socioeconomic variables.[21] Secondly, again unlike the 1994 HBS, the 1988 HBS does not contain detailed information specifying which of the two types of tertiary education a particular household member was attending. Therefore, we assigned to each tertiary education student the weighted average of the mean transfer to university and technological institute students. Certainly, this is an imperfect approximation, since there is sufficient evidence that university students come from better-off families. Both biases are likely to exaggerate the progressively redistributive impact of public education. Nevertheless, in order to be able to make comparisons between the two years, we decided to suppress the relevant information of the 1994 HBS and, firstly, assume that all household members up to 14 years of age were enrolled in school and, secondly, assign the same public transfer to each tertiary education student. Moreover, a third adjustment was also deemed necessary for the purposes of this section. According to the National Accounts, between 1988 and 1994 private consumption expenditure per capita declined by 1.2%[22], whereas the Household Budget Surveys record a decline of 7.1%.[23] Taking into account that the estimates of the in-kind public education transfers were calculated using information derived from the National Accounts, it was decided – for reasons of consistency – to adjust the consumption expenditures of all households in the sample of the 1994 HBS by the corresponding adjustment factor.[24]

Comparisons of the impact of in-kind transfers of public education services on aggregate inequality for 1988 and 1994 are reported in Figure 4. The aggregate impact of these transfers is depicted in the top panel of the graph. All indices show that the in-kind transfers of education services were resulting in a more significant decline in aggregate inequality in 1988 than in 1994. Moreover, it is interesting to note that the decline is larger in those indices that are relatively more sensitive to changes at the lower end of the distribution [Atkinson (e=2), second Theil].

The next three panels of Figure 4 analyze the corresponding changes separately for each particular level of the education system. With respect to primary education transfers, the estimates show that their progressivity rose between 1988 and 1994 according to all but one

FIG.4.- Distributional impact of public education in Greece: 1988 and 1994 (all households)

All transfers

Primary education

Secondary education

Tertiary education
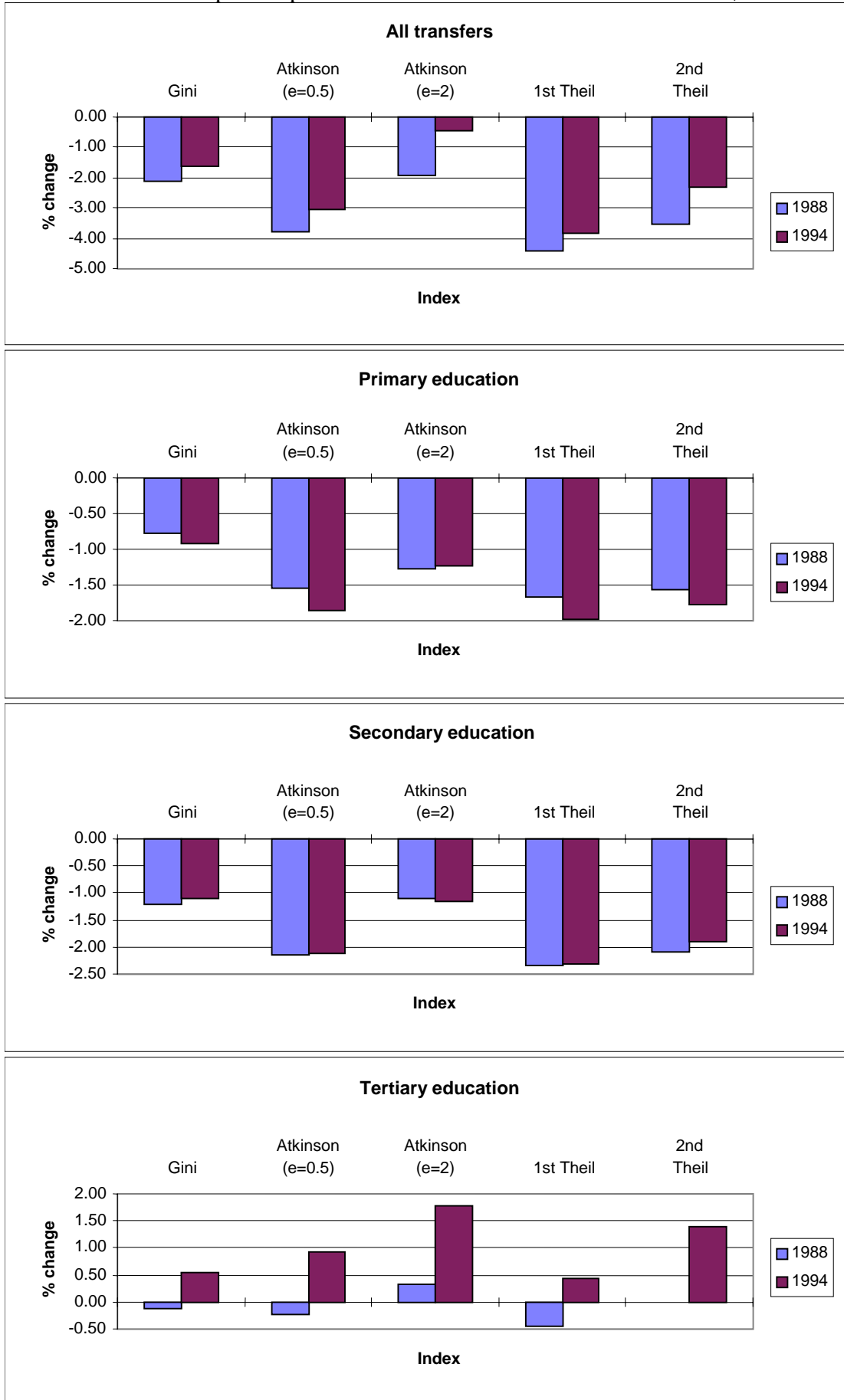
of the indices used in the paper. This change should be attributed principally to the fact that, in real terms, the value of the mean primary education transfer per pupil rose by a little over a third between the two surveys while, as noted earlier, these transfers are directed to all but the very rich households.

Despite the fact that the participation of students from poorer households in secondary education was higher in 1994 than in 1988, no similar change is observed regarding the distributional impact of secondary education transfers. As a result of these transfers the proportional changes in the values of the indices in 1994 were almost identical as in 1988. This is probably due to the fact that the positive effects of increased participation are offset by the effects of the small decline, by 4.9%, in the mean value of the secondary education transfer.

However, the most dramatic changes are observed in the field of tertiary education. In 1988 three of the indices used in the paper rose and two declined when tertiary education transfers were accounted for, whereas in 1994 all the indices record an increase in post-transfer inequality. This change, in turn, should be attributed to two factors. Firstly, the mean value of these transfers, which are directed disproportionately to upper-middle households, rose by almost 40% in real terms between the two surveys. Secondly, the increase in the competitiveness of the system, must have hit proportionately stronger candidates from poorer population strata.[25]

6. Conclusions, caveats and possible policy implications

The aim of the paper was to examine the distributional impact of in-kind public education transfers in Greece. Ideally it would be desirable to examine this impact in a dynamic framework using life-time income profiles of the population members. Since such data are not available in Greece, several alternatives were tried, exploiting cross-sectional information. The findings of the paper show that transfers-in-kind in the field of public education in Greece lead to a decline in aggregate inequality. This equalizing effect is the result of transfers in the fields of primary and secondary education, whereas transfers in the field of tertiary education were found to have a regressive distributional impact. The regressive distributional impact of tertiary education transfers is, in turn, due almost exclusively to transfers to University (AEI) students, while transfers to students of Technological Institutes (TEI) affect aggregate inequality very little. Further, the results of the paper show that between 1988 and 1994 the aggregate progressivity of in-kind public education transfers declined. The driving force behind this decline was an increase in the regressive impact of public education transfers to tertiary education students.

In fact it is highly likely that the real distributional impact of in-kind transfers to University students is even more regressive, because, due to lack of detailed information in the HBS, we assigned the same transfer to each university student. However, there is sufficient

indirect evidence that the offspring of the most well-off segments of the population are significantly over-represented in the faculties with the highest cost per student, such as medicine and engineering.[26]

Moreover, the paper examines the distributional impact of public education from a static point of view whereas, from a dynamic point of view, a number of studies show that tertiary education graduates are likely to enjoy a considerably higher standard of living than the rest of the population.[27] Table 6 highlights this point very clearly. In this table, the demographically homogeneous group of members of the sample of the 1993/94 HBS aged 35-55 is isolated and their living standards (equivalent consumption expenditure) are examined. On average, the equivalent consumption expenditure of a tertiary education graduate is 44.4% higher than that of the group mean. Likewise, upper secondary education graduates enjoy a level of consumption expenditure 15.0% higher than the group mean, while the mean equivalent consumption expenditure of persons with only primary education completed or, even worse, those who did not complete primary education is substantially lower than the group mean. These results are not due to a few outliers. Tertiary education graduates are substantially over-represented in the top quintile while the opposite is true for persons with low educational qualifications. Therefore, it is not unlikely that even if a tertiary education transfer is directed to a student coming from a poor household and, hence, in the short-term appears to be progressive according to our methodology, it may turn out to be regressive from a long-term life-cycle perspective. In addition, in Greece, as in many developing countries, a positive relationship exists between father's education and returns to schooling, which implies that, *ceteris paribus*, returns to tertiary education are higher to offspring of better-off households.[28] In other words, the above evidence suggests that from a dynamic perspective the results of the paper may underestimate the regressive impact of public in-kind transfers of tertiary education services (even though this conjecture cannot be tested using the existing data).

One of the most important finding of our analysis is that transfers to tertiary education students became more regressive in recent years. This finding is congruent with the predictions of R. Fernandez and R. Rogerson, in whose model of the dynamics of public education subsidies, it is shown that as an economy moves from poorer to wealthier, endogenous forces in the political system facilitate the imposition of higher barriers to entry.[29] Such undesirable consequences of public policy had not been influencing the debate on educational reform. Greece is a country where public opinion is firmly embedded in the idea that the rule of free public tertiary education should be applied indiscriminately to all citizens. In the rest of the paper we discuss, in the light of the evidence presented, a number of policies that might be able to mitigate such unwanted side-effects.

It has been suggested in the public discourse that a constitutional reform allowing the establishment of private tertiary education institutions would result in an enrollment of many offspring of well-off families to these institutions, thus freeing many places in public

TABLE 6

COMPARISONS OF LIVING STANDARDS OF PERSONS AGED 35-55 ACCORDING TO THEIR EDUCATION QUALIFICATIONS

Highest level of education completed	Mean equivalent expenditure Group mean : 100	Allocation of persons to quintiles according to their educational qualifications				
		Bottom	Lower middle	Middle	Upper middle	Top quintile
Tertiary	144.39	4.55	8.09	15.68	24.15	47.41
Upper Secondary	115.00	9.28	16.87	20.26	26.15	27.54
Lower Secondary	100.99	17.42	18.91	20.97	22.10	20.41
Primary	81.71	27.37	25.50	21.73	16.77	8.63
Primary not completed	72.68	38.98	23.88	18.16	12.04	6.94

tertiary education institutions for offspring of poorer families and improving the distributional impact of public tertiary education. Indeed, the experience of the operation of private primary and secondary education seems to support this claim. Two counter-arguments are usually made to this argument. Firstly, the experience of several countries shows that when the better-off segments of the population do not benefit from a particular policy, they are unwilling to finance it, thus, jeopardizing the entire public policy in the relevant domain (in this case, public tertiary education).[30] Secondly, it is widely-accepted that there are considerable asymmetries in the market for tertiary education services. The experience of some countries shows that the establishment of private tertiary education institutions may result in a decline rather than an improvement of the efficiency of tertiary education, unless it is accompanied by the establishment of a rigorous accreditation system. Further, since the professional skills required for university lecturers are more scarce than those required for primary and secondary school teachers, private universities may be better able to attract and reward them, thus leading to declining standards in public institutions.

Another alternative that has been suggested in the public discourse is the payment of fees in public tertiary education institutions (combined with a system of scholarships for students from poor families) or the imposition of a graduate tax.[31] Since the children of better-off families are over-represented in tertiary education and moreover, from a dynamic point of view, tertiary education graduates are likely to enjoy substantially higher life-time incomes than the rest of the population, such a policy is likely to improve the long-term distributional impact of public education. However, adoption of such a policy reform should be accompanied by the provision of long-term state guaranteed loans to tertiary education students, otherwise fees may act as a deterrent to potential students from poor or middle-income families. In addition, it should be noted that since tax evasion in Greece is rife, there is a danger that adoption of this kind of policies may result in an implicit or explicit subsidization of students from well-off tax evading families.

However, the most effective policy for the improvement of the distributional performance of public tertiary education in Greece is likely to be the improvement of the progressivity of public post-compulsory secondary education. As noted earlier, upper-secondary education graduates are eligible to take part in competitive examinations operating under a *numerus clausus* status to enter tertiary education. Therefore, in theory, everybody has the same chances to succeed. However, the reality is very different. As noted earlier, the proportion of children from poor households who do not complete compulsory education is substantially higher than the corresponding proportion of children from rich households. Likewise, the evidence of the first row of Table 7, suggests that participation in the post-compulsory secondary education is positively related with the economic status of the student's household; the proportion of persons aged 15-17 who do not participate in the post-compulsory stages of secondary education is more than twelve times as high in the bottom than in the top quintile. Moreover, as the evidence of the next row of Table 7 points out,

TABLE 7

PARTICIPATION IN EDUCATION AND PRIVATE SPENDING PER UPPER-SECONDARY EDUCATION STUDENT PER QUINTILE: GREECE 1994

	Quintile				
	Bottom	Lower middle	Middle	Upper middle	Top
Proportion of persons aged 15-17 not in education, %	31.51	11.16	10.05	9.18	2.50
Proportion of upper secondary education students in technical education, %	23.62	21.67	18.97	24.85	12.53
Proportion of households with upper-secondary education students with expenditures on fees for cram schools and private tuition, %	22.00	42.33	52.51	57.87	62.82
Monthly mean private spending per upper-secondary education student attending a cram school or taking private tuition, in drachmas	9226	15096	19218	26318	33875
Ratio of tertiary education to upper secondary education students	0.3068	0.3644	0.5264	0.6179	0.4989
Ratio of university to general upper secondary education students	0.2769	0.2760	0.3850	0.5501	0.3632

although the evidence is not clear-cut, among those aged 15-17 who participate in secondary education, the proportion of those who attend technical rather than general education is higher among the poorer students. As a result, fewer students from poor households reach the starting line for tertiary education entrance examinations and even those who reach it are more likely to be blocked from participating in examinations for a place in a university.

On top of these, even those students from poor households who reach the entrance examinations are less likely to succeed than students from rich households. Greek households spend considerable sums of money in order to prepare their children to succeed in these exams. As noted in Section 2, a large number of institutions offering private tuition to the candidates to succeed in the exams operate in parallel with the official education system.[32] As the evidence of the next row of Table 7 demonstrates, the probability that an upper secondary education student will attend a cram school or receive private tuition is closely associated with the socioeconomic status of his or her family. In fact this probability is almost three times higher for such a student belonging to the top than to the bottom quintile. Further, it is not only the probability of attending a cram school or receiving private tuition that is closely associated with the socioeconomic status of the student's family, but also the actual amount of spending in services of this kind. The evidence of the fourth row of Table 7 shows that, on average, spending per upper secondary education student attending a cram school or receiving private tuition is 3.7 times higher for students belonging to the top than to the bottom quintile. As a consequence, the ratio of tertiary education (university) students to upper secondary (general upper secondary) education reported in the last row of Table 7 is positively related to the quintile of the student's household.[33] Under these circumstances, it is easy to understand why students from richer households are over-

represented in tertiary education. Hence, policies aimed to address these inequities - such as the provision of grants and other incentives to students from poor households in order to stay in education after the completion of compulsory education or the provision of free supplementary tuition in public schools - are likely to improve at the same time the distributional impact of both upper secondary and tertiary public education.[34]

Notes

1.   The original discussion is in S. Kuznets, "Economic growth and income inequality", *American Economic Review* 45 (1955) : 1-28. For a recent critique, see M. Bruno, M. Ravallion and L. Squire, «Equity and growth in developing countries : Old and new perspectives on the policy issues», in *Income distribution and high-quality growth*, eds. V. Tanzi and K.Y. Chu (Cambridge, MA : MIT Press, 1998).

2.   For example, see G. Psacharopoulos and M. Woodhall *Education for development : An analysis of investment choices* (Oxford : Oxford University Press, 1985).

3.   The latest estimates are reported in T. Magoula and G. Psacharopoulos, «Schooling and monetary rewards in Greece: Contributions to a debate» (Athens University of Economics, Department of Economic s Discussion Paper No 90, 1997).

4.   P. Tsakloglou and M. Antoninis, «On the distributional impact of public education: Evidence from Greece» (Athens University of Economics, Department of International and European Economic Studies Discussion Paper No 1, 1997, forthcoming *Economics of Education Review*).

5.   *1997 UNESCO Statistical Yearbook* : 3-404.

6.   According to the report prepared by the Ministry of Education for the OECD, *Overview of the Greek education system* (Athens, 1995), putting together public and private education expenditures raises the share of education in GDP to 6.34% : 68, 73.

7.   In 1994 1US$=242.6 drachmas. See *IMF International Financial Statistics* (1997) : 419.

8.   Nevertheless, it can be argued that in such studies it may be preferable to use distributions of persons rather than households, as argued by A. Sen in *Inequality reexamined* (Oxford: Clarendon Press, 1992). When we repeated the exercise using distributions of equivalent consumption expenditure per capita (instead of distributions of equivalent consumption expenditure per household) the results were almost identical to those reported in Tables 2-4 below.

9.   A.J.M Hagenaars, K. de Vos, and M.A. Zaidi, *Poverty statistics in the late 1980s: Research based on micro-data*, Theme 3, Series C (Luxembourg : Eurostat, 1994).

10.   Likewise, a small number of persons who were recorded as tertiary education students in the HBS but were found to belong to households with relatively high expenditures on fees for post-secondary vocational training courses (presumably IEK students) were not considered as beneficiaries of the public education system.

11.   In line with the relevant empirical literature, the present analysis ignores static or dynamic externalities that may arise from the provision of free public education services as well as the shifting of costs and benefits to unintended parties. See, for example, J.P. Jallade, *Public expenditure on education and income distribution in Colombia*, (Baltimore : Johns Hopkins University Press, 1974), J. Meerman, *Public expenditure in Malaysia : Who benefits and why* (New York : Oxford University Press, 1979), M. Selowsky, *Who benefits from public expenditures? A case study of Colombia*, (New York : Oxford University Press, 1979), E. Jimenez «The public subsidization of education and health in developing countries: A review of equity and efficiency», *World Bank Research Observer* 1 (1986) : 111-129, J.B. Knight and R.H. Sabot, *Education, productivity and inequality: The East African natural experiment* (Oxford : Oxford University Press, 1990), T.M. Smeeding, P. Saunders, J. Coder, S. Jenkins, J. Fritzell, A.J.M. Hagenaars, R. Hauser and M. Wolfson M. «Poverty, inequality and living standard impacts across seven nations: the effects of non-cash subsidies for health, education and housing», *Review of Income and Wealth* 39 (1993) : 229-256, T.M. Selden and M.J. Wasylenko «Measuring the distributional effects of public education in Peru», in *Public spending and the poor: Theory and evidence*, eds. D. van de Walle and K. Nead (Baltimore : Johns Hopkins University Press, 1995). Relaxation of this assumption could influence the results of the paper to a considerable extent. In a recent paper entitled «*Distributional incidence of educational expenditures : Intergenerational and capital market effects*» (mimeo, 1998), F. Bourguignon questions the validity of static distributional incidence analysis of public spending in education, using a model of inter-generational transfers.

12.   It is likely that the proportion of tertiary education students who study in places other than that where their families live is higher, but a considerable proportion of these students were interviewed in the houses of their families during vacation periods.

13.   In our analysis indirect public transfers to students, such as discounted transport fares, are ignored, since information on them is not available in the HBS. Moreover, it is likely that in some remote rural areas as well as in some small islands, where class sizes are very small and/or the students are transported to the nearest school at the expense of the state, the cost per student in secondary and, particularly, primary education is substantially higher than the corresponding costs in

urban areas. However, no corresponding cost estimates are available and, furthermore, it is doubtful whether this higher cost translates into higher quality of the final product (education services).

14. The axiom of mean-independence states that the level of inequality must remain unchanged if the incomes of all population members change by the same proportion - thus, excluding the possibility that the value of the index may change if incomes are measured in dollars, pounds, drachmas, etc. Even though this axiom is standard in the theory of inequality measurement, in the framework of our analysis it implies that inequality will remain unchanged if public transfers are proportional to the consumption expenditures of the households - an assumption far from uncontroversial. See also F. Cowell *Measuring inequality*, (London : Prentice Hall/Harvester Wheatsheaf, 2nd.ed, 1995).

15. When the Lorenz curves of two distributions intersect, it is possible to find indices satisfying the axioms reported in section 3 which would give a reverse ranking; that is, in the context of the estimates of Table 2 they would report an increase rather than a decline in aggregate inequality (mainly as a consequence of the decline in the share of the top decile after the impact of the transfers is accounted for).

16. The average number of children aged 6-17 per household is 0.88 in the bottom quintile of Table 3, 0.80 in the lower middle, 0.71 in the middle, 0.65 in the upper middle and 0.52 in the top quintile.

17. Since private education has a very high income elasticity of demand, it is likely that the consistent finding of the paper that households of the top decile are relatively under-represented among the beneficiaries of tertiary education in comparison with the middle and upper-middle deciles, should be attributed to the fact that a considerable proportion of the offspring of these households aged 18-24 study abroad. Nevertheless, this hypothesis cannot be tested using the data of the HBS, because no relevant information is available.

18. See Ministry of Education (n.5 above) : 68.

19. Council of Higher Education *Bulletin No 20* (Athens, 1995) : 27, 30, 32

20. This was, essentially, the first time that vocational training was established on a massive scale in Greece. However, in their initial stages, most of the specializations offered by the IEK were duplicating rather than supplementing the specializations offered by Universities and Technological Institutes.

21. For example, in the 1993/94 HBS over three fifths of the children aged 6-14 who do not participate in the education system belong to households located at the bottom quintile of the distribution of equivalent expenditure.

22. National Statistical Service of Greece *Statistical Yearbook of Greece* (Athens, 1997) : 42, 501

23. Discrepancies of such a magnitude between National Accounts and Household Budget Surveys are not uncommon in many countries and can be attributed to differences in concepts and samples used in National Accounts and Household Budget Surveys.

24. Nevertheless, the results are hardly affected by this adjustment.

25. It is interesting to note that the participation of students from very rich households also declined between the two surveys. However, the effect of this decline was less important than the effect of the decline in the participation of students from poor households. Further, it should be noted that similar trends to those recorded in Figure 4 are also observed when the sample is restricted to households with heads aged 25-60 or to households with members aged 6-24 (results available from the authors on request).

26. M. Chrysakis «Uneven access to tertiary education: the impact of educational changes», in *The University in Greece today*, ed. N. Petralias (Athens : Sakis Karayiorgas Foundation, 1991) and M. Petychaki-Henze «Trends in social mobility in Greece» (Athens University of Economics and Business, Department of Economics Discussion Paper No 26).

27. P. Tsakloglou «Aspects of inequality in Greece: Measurement, decomposition and inter-temporal change: 1974, 1982», *Journal of Development Economics* 40 (1993) : 53-74 and «Changes in inequality in Greece in the 1970s and the 1980s", in *Changing patterns in the distribution of economic welfare: What happened during the 1980s?*, eds. P. Gottschalk, B. Gustafsson and E. Palmer (Cambridge : Cambridge University Press, 1997).

28. H.A. Patrinos «Socioeconomic background, schooling, experience, ability and monetary rewards in Greece», *Economics of Education Review* 14 (1995) : 85-91.

29.   R. Fernandez and R. Rogerson «On the political economy of education subsidies», *Review of Economic Studies* 62 (1995) : 249-262

30.   See J. Le Grand and D. Winter «The middle classes and the welfare state under Conservative and Labour governments», *Journal of Public Policy* 6 (1985) : 399-430 and A. Dilnot «Assessment: The future of the welfare state», *Oxford Review of Economic Policy* 11/3 (1995) : 1-10 and the references cited there.

31.   H.A. Patrinos «Higher education finance and economic inequality in Greece», *Comparative Education Review* 36 (1992) : 298-308.

32.   C.N. Kanellopoulos and G. Psacharopoulos G. «Private education expenditure in a 'free education' country: the case of Greece», *International Journal of Educational Development* 17 (1997) : 73-81.

33.   A striking reversal is observed in these columns in the top quintile. As noted earlier, a considerable proportion of the children of the households of the top quintile are likely to be found studying in a foreign rather than a Greek university.

34.   Moreover, since there exists a considerably body of evidence that success or failure in education is closely associated with the student's social environment and cultural capital, successful policies aiming to reduce inequities in educational outcomes may need to start during the earlier rather than the later stages of the education system.