

Estimation of Education Intergenerational Transfers in Indonesia

Maliki
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Tables of Content

I. OBJECTIVE AND BACKGROUND.....	2
II. LITERATURE REVIEW.....	3
III. EDUCATION IN INDONESIA.....	6
III.1 EDUCATION SYSTEM AND POLICY.....	6
IV. DATA DESCRIPTION.....	8
IV.1 DATA ON PRIVATE EDUCATION EXPENDITURES.....	8
IV.2 DATA DESCRIPTION ON PUBLIC EXPENDITURES.....	10
V. METHODOLOGY OF ESTIMATION PRIVATE AND PUBLIC EDUCATION AGE PROFILE.....	11
V.1 ESTIMATION PRIVATE EDUCATION TRANSFERS.....	11
V.1.1 <i>Private Education Inflow.....</i>	<i>11</i>
V.1.2 <i>Private Education Outflow.....</i>	<i>12</i>
V.1.3 <i>Net Private Education Transfers.....</i>	<i>13</i>
V.2 ESTIMATION PUBLIC EDUCATION TRANSFERS.....	13
V.2.1 <i>Estimation Public Education Transfers Inflow.....</i>	<i>13</i>
VI. RESULTS AND DISCUSSION.....	15
VI.1 ESTIMATION ON PRIVATE EDUCATION TRANSFERS RESULTS.....	15
VI.1.1 <i>Test on Estimation Private Education Transfers.....</i>	<i>15</i>
VI.1.2 <i>Estimation of Private Education Transfers Inflow Results.....</i>	<i>16</i>
VI.1.3 <i>Estimation of Private Education Transfers Outflow Results.....</i>	<i>17</i>
VI.1.4 <i>Estimation of Private Education Transfers Net Flow Results.....</i>	<i>18</i>
VI.2 ESTIMATION OF PUBLIC EDUCATION TRANSFERS RESULTS.....	19
VII. CONCLUSION.....	22

ABSTRACT

This paper is to develop a new method to estimate both familial education transfers and public education transfers using Indonesian Socio Economic Survey (*Susenas*) and Indonesian government budgeting data. Investigations of intergenerational transfers have been deficient mainly due to the unavailability of data on individual transfers. This paper is the first to attempt to construct individual education intergenerational transfers. Testing goodness-of-fit to the estimation results indicates that the estimated individual data does not show any biased. The results show that the positive net education transfers peak at age around 18 years and the negative net education transfers reach minimum point at age between 45 and 50. This leads to intersection with zero net transfers at age between 25 and 30 year, which indicates break-even point age. Recipient age of education transfers is considered to be younger in Indonesia than those of the United States (Lee 1994). Familial education transfers contribute 25%, 36%, and 45% for junior, senior, and higher education level respectively in fiscal year 1993/1994. In general, the private contributions tend to grow over time especially in higher education level. Even though the enrollment rate of higher education is considerably low, this is a sign of increasing demand of higher level of education in Indonesia.

I. Objective and Background

Education can be perceived either as an investment (Becker 1962; Mincer 1958; Schultz 1960) or as consumption (Schultz 1960). As an investment, education makes children become more 'able' and allows them to become part of a productive economy. Education stimulates and increases human potential (Becker 1962). In a society where retired parents usually depend on their children for support, the education of children is an investment for both parents and children. Retired parents can expect returns on the wealth they have put into children's education. In other societies where the capital market is more available, independent retired parents educate children for their own satisfaction. Children's education and earnings enable them preserve or even enhance their social status without any concern for monetary consequences in the future. In these societies and among parents who get higher utility, education is perceived more as consumption than investment. However, there is no clear cut line between parents who perceive education as consumption and those who perceive it as investment. Parental attitudes often lie between the two perceptions. In addition to getting satisfaction out of their children's educational achievements, these parents also expect some financial return in the future.

This paper is to develop a new method to estimate both familial education transfers and public education transfers using Indonesian Socio Economic Survey (*Susenas*) and Indonesian government budgeting data. This paper is the first to attempt to develop a new methodology for estimating individual intergenerational transfers as well as an attempt to construct national education transfers. The national education transfers account also makes up part of the National Transfers Account (NTA) project¹.

Investigations of intergenerational transfers have been deficient mainly due to the unavailability of data on individual transfers. Constructing a model of familial and public transfers based on four years of national survey and fiscal data provides a significant advance to intergenerational transfers' literature, with implications for application to further economic analysis and policy formation. Decomposition of household level educational expenditures to the individual level enables us to analyze the age profile of private educational transfers and how these compare to those public educational transfers. Transfers flow from private sources such as parents or household heads to school age groups. Public sources come from taxation of the productive age group and are then allocated by the government for education. This paper will study both private and public educational transfers from a macroeconomic perspective. The question is how the private transfers in education respond to government transfer and policy enforced.

In the following section, I briefly review the literature to better understand the essential of education transfers to human capital development. Following the literature review, I describe the data used for both private and public education account. The methodology of account estimation, results and analysis are covered in section V and VI respectively.

II. Literature Review

Education involves intergenerational transfers whether it is understood as investment, consumption, or both. Education as an indicator of children's quality is a means of human capital transmission. Intergenerational education transfers are sustained from generation

to generation. Parents transmit 'value' to their children and in the future the children do the same for their own children. Although there is no explicit contract between parents and children, this mechanism works most of the time. The 'value' brought by parents is strong enough to sustain the mechanism into the future (Anderberg et al. 2003).

Several studies have attempted to explain the flow of resources across generations in both the familial system and public system. This paper follows the conceptual framework developed by Lee (1994, 1995) for analysing the intergenerational transfer system. I apply a synthesis of Lee's theoretical framework on intergenerational transfers as constructed by the National Transfers Account team (described in the NTA proposal submitted to the NIH by Lee and Mason, 2004). Lee applies the framework to transfers in the United States using household level data, distinguishing between education, health and social security. Lee and Edward (2001, 2002) forecast public transfers in the United States based on the contingencies of current government policy. Luth (2001) similarly estimates intergenerational transfers in Germany. Mason and Miller (2000) develop a model on familial transfers for Taiwan. Mason and Ogawa (2001) also build on the model of the familial system by examining the effect of bequests and living arrangements on savings in Japan.

Familial education transfers have not been explicitly and comprehensively examined. In the United States, based on household level analysis, the direction of both private and public educational transfers is from older to younger age groups (Lee 1994). This direction contrasts with health and social security transfers which flow from younger to older age groups. The difference between the flow of educational transfers between developed countries and developing countries is that the average age of recipients in developing countries tends to be younger compared to those in developed countries.

Becker and Tomes (1976) discuss the trade off between the quantity and quality of children. Parents decide on children quality by spending wealth on education for their children. This investment complements the inherited ability of children. Hence, intergenerational transfers consist of human capital and non-human capital transfers.

Parents transmit ability to their children, invest in their education, and provide gifts and/or bequests. Altruistic parents react to the given ability endowment by adjusting educational investment, gifts, and/or bequests. Becker and Tomes argue that parents invest in education for their children based on their perception of children's initial 'endowments'. Parents are assumed to carry perfect information on their children's ability and determine how much they will transfer to their children. To compensate less able children, parents bless them with non-human capital transfers.

Becker and Tomes (1976) also recognize the role of government in enhancing children's quality. In addition to parental transfers, the government generates educational transfers by providing public schools, supplies, and other support. Becker and Tomes argue that government intervention in children's education through public compensatory programs positively redistributes wealth. Hanushek, Leung, and Yilmaz (2001) assess the relationship between educational subsidies, negative income tax (NIT), and wage subsidies as government redistribution of wealth. A government has to balance its budget by allocating taxes earned from workers to the groups with which it is intervening. The transfer mechanism is understood to move from the productive age group to the unproductive school-age group. The interaction between family and government transfers may depend on how far the government supports education and how supportive the family is towards educating children, which may in turn depend on family background, family income, and other unobserved factors.

There are at least three parties that directly relate with education; parents, government, and children. Becker and Tomes (1976) initiate the analysis of the relationship among parents, children, and government. As the extension to Becker and Tomes (1976), Becker and Murphy (1988) also discuss the existence of government involvement in the family decision. Government intervention towards parents and children relationship is to ensure that children have enough education. Market failure due to credit market constraint and imperfect information are legitimate reason for the government intervention to family decisions. Therefore, government try to ensure parents send their children to gain enough education. Government intervention through spending development budget on the

education sector can reduce inefficiency, which may result from relying solely on parents investing their wealth in children's education (Becker and Murphy 1988).

Some literature investigates the effect of government intervention on private education decisions. There is a few literature on compulsory education (Spohr 2003; Lleras-Muney 2001; Acemoglu 1999; Goldin and Katz 1998; Angrist and Krueger 1990). Some studies investigate the effect of government subsidies (Peltzman 1973; Schultz 2004) and tuition policies (Heckman, Lochner, and Taber 1998) on enrollment rates. Peltzman (1973) examines the interaction between government subsidies and private education expenditures at the college level. Schultz (2004) evaluates the effect of school subsidies, the Mexican *Progressa* poverty program, on enrollment. Duflo (2001) evaluates the effect of constructing new elementary schools on the years of education and earnings in Indonesia. They mainly find a positive effect of the government intervention to enrollment rates especially in the basic education, their years of education, and their future earnings.

III. Education in Indonesia

III.1 Education System and Policy

Indonesian education system is regulated based on the Law No. 2 year 1989 on National Education System. The system is rooted from early national education system around 1950's that divided the schools into two divisions, general and Islamic system. Figure 3.1 and Figure 3.2 show comparison the school systems in two generations. The formal education system consists of general education and religion-based education. Through continues and hierarchy system, the formal school system starts from elementary school to higher education level.

Compulsory education first appeared on the development agenda in 1950, five years after Independent Day, August 1945. The main objectives were to diminish big gap between aristocrat and non-aristocrat, men and women, and also different group of ethnics. Five

million students were already in elementary school (*Sekolah Rakyat*) (Tilaar 1995). There were still another 5 million school-age children that needed schools (Tilaar 1995). As a result, the compulsory program required more school buildings, teachers, and school supplies. Despite the limited budget, the program started in specifically appointed districts in all provinces. Almost 60% of the districts had enforced the compulsory education by 1959.

Education development has been the priority at every long-term development plans. The first priority was to reach the quantity of education as provided for in 1973 President Instruction Program (SD INPRES), when the Indonesian government received a windfall from the oil price shock. The government built almost 150 thousand new school units, 166 thousand new classrooms, and rehabilitated nearly 380 thousand school units starting from fiscal year 1973/1974 to fiscal year 1993/1994. The government also formally abolished tuition fee for elementary level in 1973. The government also supported book supplies and teacher development programs. The SD INPRES program was an extensive project, which developing countries ever went through. In 1984, in line with this program, the Indonesian government formally started the 6-year compulsory basic education program. In 1994, ten years later, the government extended the program to a 9-year compulsory basic education program.

The goal of compulsory education program to achieve universal basic education was threatened due to the financial crisis. Hence, the social safety net constructed soon after the 1997 financial crisis was meant to protect the poor from the impact of the crisis. The government started the scholarships program to protect the poor of the primary and secondary school-aged group to overcome the impact of the crisis.

The most recent challenged policy in education is the effort to decentralize education system to the district level. According to Law number 22/1999 on district governments and Law number 25/1999 on decentralization, the central government has to hand authority on education policy over to the district government. Prior to the decentralized system, education policy in Indonesia was fully centralized. Central government fully

controls the budget allocation for education to all schools. Under this centralized system, Most of the budgeting came from the central government through the Ministry of National Education, the Ministry of Religion Affair, the Ministry of Finance, the National Development and Planning Agency, and the Ministry of Home Affairs. The decentralization policy has had major implications for education financing. Private contributions will be expected to have more significant role and government's role, especially the central government, will be supervisory.

Even though the Indonesian government put priority on education, the government only slightly increases the proportion of education investment since 1975. The proportion of education expenses as portion of GNP was around 1.9% in 1975 and 2.2% in 1995 (Tilaar 1995). This was relatively smaller portion compared to Thailand's investment and also Singapore's. School source of funds come from private and public resources. Households as the major sources of private spending pay for school fees related. The government pays a big portion of primary level and less portion of school spending for secondary level. The government subsidizes the higher education system less proportionally. The government contributes significantly to both private and public primary schools. However, the government does not fund the private secondary school as much as in the primary levels.

IV. Data Description

IV.1 Data on Private Education Expenditures

I use Indonesian Socio Economic Survey Data (*Susenas*). *Susenas* is an annual national represented socio economic survey. *Susenas* collects detail socio-economic information on household and individuals that live in the same households. This includes their age, gender, relation to their head, highest level of education being attended, education institution they are attending such as public or public, and other socio economic data for every member in the households. A brief consumption data is also included at the annual

Susenas survey. The annual socio-economic data collecting produces the so called *core-Susenas*.

Every three year, in addition to the *core-Susenas*, the same survey provides a detail specific socio-economic aspect of the households, such as health, education, expenditure and income. The three year cycle specific detail socio-economic household data is called *module-Susenas*. *Core-Susenas* and *module-Susenas* are compatible and easily merged. This paper uses *module-Susenas* 1993, 1996 and 1999. These *Susenas* cover a detail expenditure (food and non-food item) and income of the households. Education is one of non-food item of household expenditure that include in the data. Besides, I also use *module-Susenas* that covered detail education expenditure of year 1992, 1995 and 1998. A detailed education expenditure survey is needed to reevaluate the estimation method conducted for household expenditure and income module (*Susenas* 1993, 1996, and 1999). I also use their school-age enrollment profile to construct the public education expenditure

Table 4.1 shows data description for household and individuals for three years. Panel A indicates household characteristics and panel B exhibits individual characteristics. Each year display characters based on two categories of household head education: those who only complete primary education and those who have higher education than primary level. Excluding in the categories are those who do not complete primary schools or do not go to school at all. In the third column, I also include all samples, which cover all categories of households. The monetary data are in monthly bases with Rupiah currency, which is Rp. 2,500 for one US Dollar in 1995.

Number of children is slightly higher for lower educated parents compared to higher educated parents. It declines slightly over time to only 1.86 in 1999, while it is around 2.08 in 1993. Lower educated parents refer to older household head, while higher educated parents are relatively younger. Over time, average age of lower educated parents is getting older. The average of higher educated parents is relatively stable. In general, household head age is around 44 to 45 years of age.

In general household invest on education for only 2% out of their total expenditures, which is around Rp. 5,248 or USD 2.00 per month. The proportion is relatively stable and does not change over time. Share of education expenses is higher for higher educated parents as well as its absolute. It is almost tripled than those of lower educated parents. Higher educated parents spend more of their expenses on education, while lower educated parents spend slightly lower.

Panel B of Table 4.1 presents Individual characteristics. Including in the individuals are all members of families in the sample. Their average is between 23 and 26 years old. Samples from lower educated household head tend to be older than those come from higher educated household head. Almost 50 percent of samples are male and school enrollment varies from 24 percent to 30 percent. Parents' education relates positively to higher enrollment of individuals.

Figure 4.1 shows an age profile of private education expenditures sources for 1992 and 1995. The sources mainly come from parents, relatives, or self-sufficient. In 1995, there are also government and institution. Both years show similar pattern, from age 5 to around 25 the main sources of private education expenditures are parents. They also start to be self-sufficient from age of 20 years. In addition, in 1995, the government starts to be a major source for these age groups.

V.2 Data Description on Public Expenditures

Public transfers in education expenditures are estimated by using the national education expenditures data. I gather education expenditure data from several ministries that have different authority depending on the education levels. Five ministries are responsible for managing the national education finance as shown in Table 4.2.

The Ministry of National Education (MONE) and Ministry of Finance (MOF) coordinate to finance junior and senior high school, as well as higher education. While the Ministry

of Home Affairs (MOHA) and MOF take care most of the education financing in primary school level, The Ministry of Religious Affair (MORA) involves at all levels of religion-based schools' financing. The four ministries, MONE, MOF, MOHA, and MORA, are a direct executive agency for respective school level. The National Development and Planning Agency (Bappenas) coordinates the financing in the macro level for all the levels of educations as well as coordinates indirectly the five ministries in executing the education program planning.

V. Methodology of Estimation Private and Public Education Age Profile

The estimation of private educational transfers includes educational transfer inflow, educational transfer outflow and net educational transfers. Education transfers inflow denoted by q_i^{e+} is the transfer received or education expenditure spent by school age groups of individual i . A positive superscript indicates positive fund flow. Educational transfer outflow, denoted by q_j^{e-} , includes transfers given or educational expenditures borne by principal agent j . A negative superscript indicates negative fund flow.

Estimation of public education transfers consists of education transfers inflow and outflow estimation. All students of a particular school level are assumed to have the same average educational cost. Included in the estimation are only four levels of formal education, from elementary to higher education. Vocational schools and general education schools are considered identical. Out-of-school programs, training programs, and schools that are not registered at the Ministry of National Education are assumed insignificant.

V.1 Estimation Private Education Transfers

V.1.1 Private Education Inflow

Private education inflow, q_i^{e+} , is defined to be transfers received by household member i for educational expenditure purposes from a principal agent. This is an explicit individual

educational cost. For each household j and household member i , the individual education expenditure cost is estimated by regressing, at the household level, total household educational costs on the number of enrolled household members in each age group. The relationship is as follows:

$$q_j = \sum_f \beta_f N_{jf}^e + \varepsilon_j \quad 1$$

Assuming that the production function is homogenous degree one, q_j is educational expenses for household j , N_{jf}^e is number of enrolled household j member of age group f . The regression includes age groups 5 to 25 and older. Children are expected to start formal education at the age of 7, but a significant number of 5 and 6 year-olds are already enrolled in kindergarten. No division is made between males and females in the regression.

Coefficient β_f obtained from regression equation (1) is interpreted as average cost of education expenses of each household member or average expenditure by age. This coefficient is employed to calculate the share of education expenditures of each enrolled member. I allocate education expenditure to each enrolled member i of the household j as follows:

$$\hat{q}_i^{e+} = (q_j) \left(\frac{\hat{\beta}_f D_{fi}^e}{\sum_f \hat{\beta}_f D_{fi}^e} \right) \quad 2$$

D_{fi} dummy variable for household member i in age group f that is enrolled, zero otherwise. \hat{q}_i^{e+} is treated as estimate of education transfers received by member i in household j . Superscript $e+$ indicates transfers inflow or transfers received.

V.1.2 Private Education Outflow

Gross educational transfer outflow is total educational funds transferred by the principal agent or household members to other household members. This can be estimated by assuming that there is a principal agent who spends the entire household educational

expenses. Household agents can be principal earners in the household or household heads, but are not necessarily both. However, in Indonesia, most principal earners are also household heads. Regardless of who is the principal agent, gross educational outflow is calculated as follows:

$$q_j^{e-} = -\sum_i \widehat{q}_i^{e+} \quad 3$$

q_j^{e-} is private education outflow of household j^i from principal agent i . This is basically the net of all enrolled member education expenses, q_i^{e+} , in the household j .

V.1.3 Net Private Education Transfers

Net education flow of age group f is estimated by summing up education transfers inflow of age group f , q_{fi}^{e+} . Education outflow of the same age group f of principal agent j (also considered as a member i), q_{fi}^{e-} as follows:

$$q_{fi}^e = q_{fi}^{e+} + q_{fi}^{e-} \quad 4$$

This is a net education transfer borne by age group f . I will look at the net transfers of both education transfers outflow assumptions.

V.2 Estimation Public Education Transfers

V.2.1 Estimation Public Education Transfers Inflow

Educational transfer inflow per age group f , q_{gf}^{e+} , is calculated by assuming that all age groups at the same school level face the same average cost of education. The educational transfer inflow is estimated in several steps. First, I calculate the total budget per school level by summing up all the budgets of the responsible ministries for each school level. Second, I calculate the average cost of education per school level k , \bar{q}_{gk} . That is, I divide the total budget per school level by its number of students. Third, I calculate the

enrollment rate per age group f per school level k based on *Susenas* data. Fourth, I estimate the number of students per age group f per school level k , N_{kf} , using the calculated enrollment rate weighted by the total number of students per level. Fifth, I multiply the average cost of education per school level by the number of students per age group. Sixth, I find total education cost per age group by summing up the total cost for all school levels per age group. Finally, I find the average public transfers' inflow per age group by dividing the calculated total education cost per age group by the total number of students in age group f , P_f .

The average per capita of public transfers per age group f , q_{gf}^{e+} is expressed as follows:

$$q_{gf}^{e+} = \frac{\left[\sum_{k=1}^{k=4} \bar{q}_{gk} * N_{kf} \right]}{P_f} \quad 5$$

The average of public transfer of education level k is \bar{q}_{gk} . The number of enrolled per age group f at education level k is denoted by N_{kf} , while P_f expresses the population of age group f . I use enrollment rate profile per cohort f , E_{kf} , for education level k from *Susenas* and apply it to estimate the N_{kf} where k is education level from elementary school ($k = 1$) to higher education ($k = 4$).

$$N_{kf} = E_{kf} * P_f$$

Elementary school level age distribution starts from 5 and finished to around 18 years of age (*Susenas* 1993, 1996). For the primary school students, the early entry tends to increase during the last three years of observations. On the other hand, the repeaters also tend to decrease over time. Those who are older than 12 years of age that are still in the elementary schools in 1993 are slightly more than 9%. The peak of elementary school age is around 9.5 years of age and the profile normally distributed from 5 years of age to around 16 years of age. From the proportion predicted, I calculate the number of students at each age based on the total population in the particular age groups (P_i).

VI. Results and Discussion

VI.1 Estimation on Private Education Transfers Results

VI.1.1 Test on Estimation Private Education Transfers

I use *module-Susenas* 1992 and 1995 to fit-test equation (1). *Module-Susenas* 1992 and 1995 contain a detailed individual education expenditure in the household. I apply equation (1) to re-estimate the individual level education expenditure and compare it with the surveyed individual data. Finally, I can test whether equation (1) results a close estimation of individual education expenditures.

Figure 6.1 shows regression results of equation (1) from *module-Susenas* 1992 and 1995 data. All age groups coefficients are significantly different from zero at 99% significant level. Older age groups are associated with higher coefficients, which mean that their education share is relatively higher. Comparing 1992 and 1995, coefficients of younger age group do not change much and start to diverge from age 15. Figure 6.2 shows an individual education expenditure profile both parametric and non-parametric estimation relative to maximum value. Visual test indicates an unbiased fitting of the estimated data compared to the data. Even though the estimated value is slightly off the data value, there is no tendency of biasness. The parametric estimation's profile tends to be fluctuated around those of the non-parametric. The noise especially occurs among the teenager age groups and after. More school choices in higher level that differ in types and tuition policy may cause this fluctuation. This model, however, has not accommodated these varieties.

I regress the $\widehat{\beta}_p$ as parametric coefficients obtained from regression on equation (1) over $\widehat{\beta}_{np}$ obtained from direct calculation from the dataⁱⁱⁱ. I run the following regression:

$$\widehat{\beta}_{np} = \alpha_o + \alpha_1 \widehat{\beta}_p + \nu$$

Null Hypothesis is that the slope of regression, α_1 , should not significantly be different from one. And, intercept α_0 should not significantly be different from zero. Table 6.1 shows the regression results. Coefficients α_1 is higher than 0.96 for both years. Goodness-of-fit indicates a good fit with high R-Square (higher than 0.9) and the F-test results accept the null-hypothesis that the coefficients are not significantly different than one. The constant also has value that is small and approaching zero. Therefore, the estimated $\hat{\beta}_p$ is not biased and has a good fitted.

To more convincing test on the estimation methodology, I also regress on the individual education expenditures data over allocated individual education expenditures, \hat{q}_i as follows:

$$q_i = \gamma_0 + \gamma_1 \hat{q}_i + \varepsilon$$

Null-hypothesis is similar to the above regression. That is, the coefficient γ_1 is not significantly different than one. Regression result is presented in Table 6.2. The coefficients show higher than 0.87 with high R-square. The F-test on coefficients is slightly lower than previous test but still indicate that it is not significantly different than one. I calculate the confidence interval for both coefficients and give unbiased results, where the coefficients are within the desired range. Confidence interval^{iv} on slope coefficients shows unbiased estimation. Estimation method using equation (1) proved to produce a close proximity to the real data. Therefore, equation (1) can be applied to estimate individual education transfers from household transfers from other years where individual level data is not available.

VI.1.2 Estimation of Private Education Transfers Inflow Results

Average of individual education costs are estimated using equation (1). The regression results are shown Figure 6.3. The regressions are based on the same age profiles as

previous regressions. All age groups have significant coefficients with 99% confidence level. The coefficients are fluctuated for all three years *Susen*, 1993, 1996, 1999, and 2002. The coefficients are higher for more recent years that relates with higher unit education cost. The older age groups are the higher the coefficients.

Education transfers age profiles, which are the average of education transfers received per cohort, are presented in Figure 6.4. This is similar profile as in Figure 6.2. The profile shows a concave curve with a peak varies from age 15 to 17 years old. Fifteen years old is a transition to enter a senior high school level. The peak could be expenditures for entering new level of school. In addition to entry fees, parents also have to spend for new clothes and books. The profiles indicate a jump before the peak age that may cause of high burden of families to send their children to senior levels, which is beyond the compulsory education. Beyond the nine-year compulsory education, the government allocated budget to education focuses on public schools. Therefore, those who enrolled in private schools have to spend more budgets to finance their children. When the children are older than 17 years of age, education transfers inflow is declining. This is due to low enrollment of children in higher education. The regression results shown in Figure 6.3 indicate a higher unit cost at college age group (older than 20 years old). This implies that, once they enroll at higher education, their share in the household education expenditures is relatively high. In general, however, average education inflow transfers at college level are low that mainly because of low enrollment rate at college level.

VI.1.3 Estimation of Private Education Transfers Outflow Results

Figure 6.5 presents the gross education outflow when household head become the principal agent. The profiles show a peak at around age early fifties. High initial education gross outflow in the young age may be due to small samples of household head that is younger than twenty five years of age. Therefore, the profiles tend to have more fluctuates and results high average. Household heads who are older than forty years old gave higher education transfers resulting from have more members who enroll in either elementary or junior high schools. They also start to have member who enroll in higher than senior high school. Families are starting to be more stable in these types of families.

Beyond fifties, the education transfers outflow start to decline. This is when the burden of household head to shift from children education to household savings.

VI.1.4 Estimation of Private Education Transfers Net Flow Results

Combining education outflow and inflow by using equation (5) provide a net education transfers profile per cohort. Table 6.3 presents average of age recipients and transfers givers from two assumptions. The age recipients are around 16 and 17 years of age. Age of household head is older than the taxed members^v. There is almost 39 years difference between recipients and household head. It is only 29 years difference between transfers recipients and taxed members.

A clear description of transfer flow is shown in figure 6.8. Arrows are constructed to show the flow of education transfers. The average of age household heads as a principal agent who perform transfers is located in the base. The average of age of those who enroll and receive education transfers is located at the arrow's head. The width of arrows indicates the average of education inflow or outflow^{vi}. Each year has two arrows that indicate two approaches employed for estimating the education outflow. The colored arrows are for the first approach and the uncolored arrows indicate the second approach. I put transfers profile of the United States for comparison.

The arrow widths are increasing over time. Two approaches show different bases age, which the second approach has younger bases that is around 44 years of age compared to 55 years of age for the first approach. The average age recipients are almost the same that is around 16 years of age. Even though the bases year and average age recipients are only slightly different, they tend to shift to older age. Indonesian bases ages are almost the same as those of the United States. But the net recipients at the United States are older compared to those of Indonesia. This is reasonable that years of education in the United States are relatively higher than years of education in Indonesia.

VI.2 Estimation of Public Education Transfers Results

Table 6.4 shows a summary of public education expenditures allocation. Including in the table are from fiscal year 1993/1994, 1995/1996, 1998/1999 and 1999/2000. The table is summarized based on responsible ministries and type of programs. Five levels of education receive major government attentions. More types of schools are not shown, such as training in the government department and the education system outside the Ministry of National Education system. The government subsidizes these training schools but the allocated budget and number of students considered minor and negligible. MONE manages largest portion of the education budget. As previously mentioned, MONE is mainly an executive ministry for junior, senior, and higher education. MONE also administer out-of-school education, but the proportion is away smaller than the formal schools. Junior high school level receives higher recurrent budget than senior high school levels.

The Ministry of Home Affairs manages teachers' primary salary, one of large budget allocation to primary level, and collaborates with Bappenas to manage SD-INPRES program. Number of teachers at elementary level is considerably much more than those at junior high level or even senior high level schools. Therefore, the allocation is also contributing as major part of total allocation of primary level budget. In addition, Ministry of Finance (MOF) directly allocates subsidy for primary school level as part of their recurrent budget. Finally, the Social safety net program during financial crisis contributes to primary school level financing started in 1998/1999 fiscal year. The program is a collaborative program among MONE, MORA, MOF, and *Bappenas*.

Table 6.5 shows a gross enrollment rate and average public transfers per school level that is obtained by dividing the total allocated budget by number of students per school level. The enrollment rate for elementary level reaches higher than 100% in fiscal 1993/1994. On the other hand, the enrollment rate of junior level is relatively low and slightly higher than 50% in the same fiscal year. By the fiscal year 1999/2000 the enrollment rate is

higher than 70%. This is due to both higher number of student of that level and lower population in the respective age groups. While senior high school enrollment rate is fluctuated, higher education enrollment rate indicates a stable growth.

Primary school has slightly higher average public transfers compared to junior high school at fiscal year 1993/1994. However, it is still lower than the average of senior high school and higher education. Even though totally elementary schools receive larger total budget, for the last ten year, in average the elementary level receives lower and relatively stable than those of other levels. Junior high school level, in contrary, obtains a higher average education budget after the fiscal year 1993/1994. And its gap between junior and elementary level is constantly increasing. So do the senior high level and higher education, their average public transfers are significantly higher than those in elementary schools as well as those in junior high school level.

Higher average of public education transfer for higher education level is due to slow growth enrollment at senior high school level and higher education and higher total allocated budget. Even though the government also increases the total budget for elementary school level as well as junior high school level, but the total budget growth is not proportionally to the growth of number of students. Teacher salary is the main component of elementary school budget and argued as the main contributions to the school quality. There is a slow attempt from the government to increase the elementary teachers' salary. Therefore, in general average public education transfers has slower growth in elementary schools than those in higher school level.

Table 6.6 presents accumulated public and private transfers in a year by education level and age groups. I calculate the accumulated by multiplying the average cost for each school level and number of students at the respective school level. I estimate for both private and public transfers. I also divide the profile by both school level and age groups. Comparing accumulated profile per education level and age group level reveal that some repeaters or late entry in primary schools may burden public transfers as much as 1 Billion Rupiah per year. The accumulated public transfers at primary level is about

4,891,00 billion Rupiah in fiscal year 1993/1994, while public transfers in the same year for age group 5 – 11 is about 3,734,00 billion Rupiah. If the net age of primary level is about 5 – 11, there is excess burden of public transfers to primary level due to students who are older than 12 years. The other years have the same profile and almost similar amount of excess burden. There is also inefficiency in private education transfers due to the same problem.

In higher education level, both average and accumulated private transfers are relatively higher than public transfers in fiscal year 1995/1996 and 1998/1999, while in 1993/1994 the private transfers are slightly lower than public's. Higher education experiences a rapid development in Indonesia for the last decades. Private colleges are growing more rapidly than the public colleges and are much more expensive than public colleges. While the government increases higher education budget, most the funding are going to the public universities that only facilitate small portion of college students. Therefore, when parents decide to send their children to university, most of them have to bear higher cost of private universities.

I calculate the private contributions to human capital investment compared to the public contributions weighted by number of students per school level. Focusing on the total transfers per cohort level, private contributions in education investment to those whose age is between 5 and 12 is around 13% in fiscal year 1993/1994 and is getting larger over years. The private contributions are also higher for older cohort, especially to those who are older than 16 years. This is also true if the cohort division is transformed into school levels. The higher school level is the higher private contributions. Higher education level receives more transfers from private resources than from public resources. This is due to the government priority on basic education levels. Higher education institutions are mainly private universities and receive small amount subsidies. In general, the private contributions are increasing over time. In the fiscal year 1998/1999 the private contributions are about 40%, while over 55% of the transfers to the age cohort older than 19 years also come from private resources.

VII. Conclusion

Private education transfers flow from older age to younger age. The average education transfers providers are about 36 to 43 years of age that depend on the methodology of estimating the education transfers outflow. On the other hand, the average education transfers receiver is firmly around 12 years of age. This is relatively younger than the average age of education transfers receiver in the United States, which is around 20 years old. The estimated flow of private education transfers flow in the United States mainly for higher education. Average age of transfers recipients are relatively older for developed countries compare to those of developing countries. This reflects the age structure as well as the education level distributions. The basic education is relatively free and private contributions are really small. In Indonesia, private contribution in the primary level is also small and getting larger for higher school levels. Most citizens earn basic education and small percentages of them pursue higher degree.

Education investment in Indonesia, as in any other countries, comes from private and public resources. Private education transfers counts for around 13% at primary level in fiscal year 1993/1994 and tends to increase over years. The higher school level is the higher private contribution to education investment. In junior, senior and higher education, private contribution is respectively 25%, 36%, and 45% in fiscal year 1993/1994. In general, the private contributions tend to grow over time especially in higher education level. Indonesia is still focusing on basic education. In the fiscal year 1995/1996 and 1998/1999, private contribution at higher education is relatively higher than the government transfers. Household still experiences that higher education is relatively expensive especially private institution. The government at this time is still focusing on basic education from elementary to junior level. While senior high school level currently receives more attention, the government also starts to increase support on higher education. Yet, the private institutions are still lacking behind from the government support.

Bibliography (available upon request)

Table 4. 1 Data Descriptive

	1993			1996			1999		
	Household Head Education		All	Household Head Education		All	Household Head Education		All
	Primary	Higher		Primary	Higher		Primary	Higher	
Panel A: Household Characteristics*									
Number of Children	2.26 (1.63)	2.21 (1.62)	2.08 (1.66)	2.17 (1.59)	2.07 (1.51)	1.99 (1.59)	2.01 (1.48)	1.88 (1.44)	1.86 (1.51)
Household head year of Education	6.15 (0.58)	11.44 (2.14)	5.54 (4.06)	6.14 (0.56)	11.56 (2.20)	6.05 (4.20)			
Age of Household head	41.66 (12.25)	39.41 (11.17)	44.99 (13.89)	42.34 (12.57)	39.98 (11.32)	45.06 (13.82)	43.38 (12.82)	39.81 (11.67)	45.52 (14.11)
Education share expenses**	0.020 (0.04)	0.031 (0.05)	0.02 (0.04)	0.02 (0.04)	0.03 (0.06)	0.02 (0.04)	0.02 (0.03)	0.03 (0.05)	0.02 (0.03)
Food Share expenses**	0.59 (0.13)	0.52 (0.14)	0.59 (0.13)	0.57 (0.12)	0.50 (0.14)	0.56 (0.13)	0.64 (0.11)	0.58 (0.13)	0.63 (0.12)
Total Expenditures	177,757.50 (284,093.40)	322,748.30 (332,379.00)	190,469.20 (251,864.70)	253,417.00 (194,656.80)	462,127.60 (472,035.90)	286,849.00 (309,105.90)	498,305.10 (304,078.10)	758,096.00 (542,950.00)	548,413.80 (414,820.40)
Education Expenditures	4,515.10 (23,740.12)	12,313.18 (34,992.11)	5,248.94 (22,319.11)	6,686.03 (17,296.34)	19,589.86 (50,275.17)	9,006.79 (29,922.00)	9,293.39 (25,768.70)	24,388.54 (58,535.69)	12,683.98 (38,258.09)
Labor Income	173,174.30 (207,878.40)	204,491.30 (327,167.30)	154,521.80 (229,939.30)	248,701.30 (320,425.40)	278,726.70 (397,816.10)	226,151.80 (339,006.10)			
Number of Observation'	15,928	15,852	50,740	17,688	19,034	60,584	18,124	21,525	61,228
Panel B: Individual Characteristics									
Age	24.49 (17.69)	23.91 (16.62)	26.13 (18.94)	25.25 (17.96)	24.65 (16.93)	26.63 (18.98)	26.44 (18.30)	25.34 (17.16)	27.59 (19.19)
Male**	0.51 (0.50)	0.49 (0.50)	0.50 (0.50)	0.50 (0.50)	0.49 (0.50)	0.50 (0.50)	0.51 (0.50)	0.50 (0.50)	0.50 (0.50)
Only Completed Primary**	0.37 (0.48)	0.07 (0.26)	0.18 (0.38)	0.38 (0.48)	0.07 (0.26)	0.18 (0.39)	0.61 (0.49)	0.23 (0.42)	0.47 (0.50)
Only Completed Junior level**	0.06 (0.24)	0.21 (0.40)	0.09 (0.28)	0.11 (0.32)	0.19 (0.39)	0.12 (0.32)	0.13 (0.34)	0.21 (0.41)	0.14 (0.35)
Completed higher than Junior level**	0.24 (0.43)	0.46 (0.50)	0.36 (0.48)	0.24 (0.43)	0.48 (0.50)	0.36 (0.48)	0.18 (0.39)	0.31 (0.46)	0.27 (0.45)
School**	0.25 (0.43)	0.30 (0.46)	0.24 (0.43)	0.25 (0.43)	0.29 (0.45)	0.24 (0.43)	0.23 (0.42)	0.27 (0.44)	0.23 (0.42)
Labor Income	60,652.08 (140,948.30)	66,233.12 (205,920.30)	58,153.11 (150,053.00)	90,562.53 (220,266.40)	102,455.10 (276,689.50)	88,834.92 (230,524.40)			
Number of Observation'	73,715		254,784	79,493	85,144	264,345	77,958	89,849	254,016

*All Monetary value is in Rupiah (1.00 USD = 2,500 Rupiah, 1996 exchange rate). Standard Deviation is in parentheses

Table 4.2 Type of Budget and Responsible Ministry

Responsible Ministry	Type of Budget	School Level
Ministry of National Education (MONE)	Recurrent Development Operational Maintenance (OPF) Quality Improvement	Junior High School Senior High School Higher Education
Ministry of Home Affairs (MOHA)	President' Primary School Instruction (SD-INPRES) Teacher Salary	Elementary School
Ministry of Religion Affairs (MORA)	Recurrent Development	All level of religion based school
MONE, MOF, MORA	Social Safety Net (JPS or PKM-BBM)	All level
MOF and MOHA	Primary School Subdisy	Elementary School

Table 6.1 Goodness-of-fit Regression $\hat{\beta}_{np}$ of $\hat{\beta}_p$ over parametric

Dependent Variable:	1992	1995
Education Share		
Dependent Variable: Beta Est.	0.9710 (0.0004)	0.9644 (0.0006)
Constant	0.0076 (0.0001)	0.0117 (0.0002)
N Observation	0.94	0.92
R Square	357,334	163,244
F-Test of Beta*	5667	3459

* significant with 99% confidence level

Table 6.2 Regression estimated data on real data

Dependent Variables : Estimated Data		
	1992	1995
Independent Variable : Real Data	0.87 (0.02)	0.97 (0.04)
Constant	382.23 (52.24)	117.95 (140.89)
N Observation	144958	148794
R Square	0.853	0.841

Table 6.3 Average Age

	1993	1996	1999	2002
Average of age recipients	16.80	17.05	17.16	16.73
Average of age transfers givers				
Household Head	55.61	56.87	54.21	53.33
Taxing Household Members	44.88	45.32	45.67	45.61

Table 6.4 Education Financing by Ministries and School Level (in Billion Rupiah)

Fiscal Year	School Level	Ministry of National Education (MONE)	Social Safety Net (JPS or PKM-BBM)	Primary School Subsidy	Ministry of Home Affairs (MOHA)	Ministry of Religion Affairs (MORA)	Total	Total based on APBN** (recurrent + dev)	Percapita of transfer education level specific
1993/1994	Kindegarten	-	-	87.02	4,747.90	-	4,891.35	-	164,694.31
	Primary Level	56.43	-	-	-	-	1,118.58	-	156,827.44
	Junior High School	1,118.58	-	-	-	-	998.52	-	238,187.36
	Senior High School	998.52	-	-	-	-	721.11	-	352,898.78
	High Education	721.11	-	-	-	-	747.90	-	103,730.82
	Total	3,719.54	-	-	747.90	-	4,467.44	-	-
1995/1996	Kindegarten	-	-	110.00	5,108.90	4.00	5,265.39	-	178,803.10
	Primary Level	42.49	-	-	-	128.00	1,904.94	-	226,692.99
	Junior High School	1,776.94	-	-	-	228.00	1,410.23	-	302,155.30
	Senior High School	1,182.23	-	-	-	94.00	1,226.53	-	462,853.44
	High Education	1,132.53	-	-	-	-	721.90	10,517.80	161,355.60
	Total	5,579.36	-	110.00	721.90	876.90	7,288.16	-	-
1998/1999	Kindegarten	-	-	204.87	5,296.29	6.16	5,759.71	-	196,611.02
	Primary Level	45.11	207.28	-	-	274.39	2,755.65	-	295,019.82
	Junior High School	2,408.75	72.51	-	-	376.31	1,889.67	-	366,428.73
	Senior High School	1,408.95	104.41	-	-	190.35	1,843.67	-	602,573.24
	High Education	1,653.32	-	-	-	-	981.00	1,552.80	10,610.07
	Total	7,871.40	-	204.87	981.00	1,552.80	10,610.07	16,384.30	219,048.62
1999/2000	Kindegarten	-	-	234.98	5,740.00	8.19	8,089.72	-	283,760.61
	Primary Level	452.78	1,653.77	-	-	366.60	3,732.68	-	396,535.62
	Junior High School	3,292.99	73.09	-	-	501.24	3,213.43	-	605,705.25
	Senior High School	2,609.27	102.92	-	-	254.17	3,301.72	-	949,108.82
	High Education	3,047.55	-	-	-	-	1,467.00	2,070.20	19,548.61
	Total	15,776.43	-	234.98	1,467.00	2,070.20	19,548.61	23,780.70	404,574.10

Table 6.5 Enrollment Rate, Budget and Per-Capita Public Transfer per School Level Summary*

Fiscal Year	School Level	Gross Enrollment	Total Budget	Percapita Public Transfer per School Level
1993/1994	Kindergarten	34.96%		
	Primary Level	109.92%	4,891.35	164,694.31
	Junior High School	53.86%	1,118.58	156,827.44
	Senior High School	33.87%	998.52	238,187.36
	High Education	14.23%	721.11	352,898.78
1995/1996	Kindergarten	39.15%		
	Primary Level	111.88%	5,265.39	178,803.10
	Junior High School	62.32%	1,904.94	226,692.99
	Senior High School	35.97%	1,410.23	302,155.30
	High Education	16.96%	1,226.53	462,853.44
1998/1999	Kindergarten	37.63%		
	Primary Level	114.52%	5,759.71	196,611.02
	Junior High School	70.43%	2,755.65	295,019.82
	Senior High School	38.31%	1,889.67	366,428.73
	High Education	18.09%	1,843.67	602,573.24
1999/2000	Kindergarten			
	Primary Level	111.99%	8,089.72	283,760.61
	Junior High School	73.27%	3,732.68	396,535.62
	Senior High School	39.48%	3,213.43	605,705.25
	High Education	19.43%	3,301.72	949,108.82

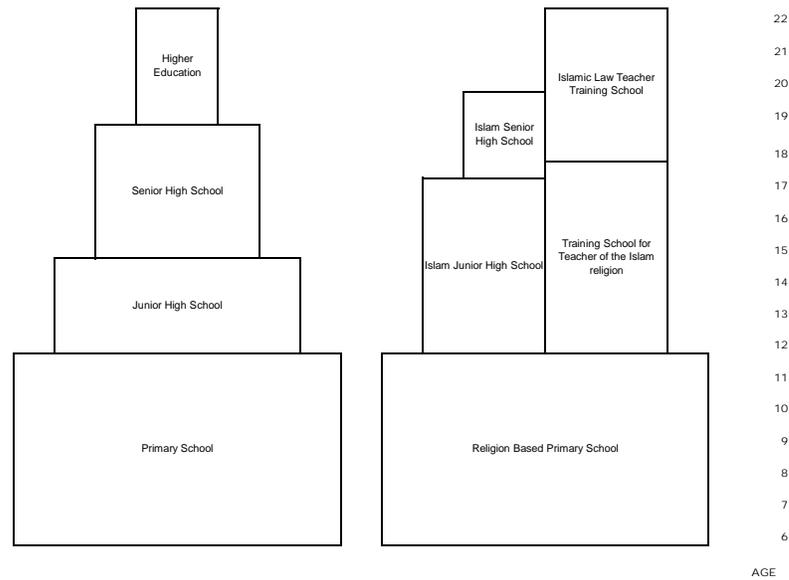
Note: * Total Budget in Billion Rupiah, per-capita public transfers per school level is in Rupiah.

Table 6.6 Average and Accumulated Private and Public Education Transfers

Education Level or Cohort	1993		1996		1999	
	Average Transfers per School Level (in Rupiah)					
	Private	Public	Private	Public	Private	Public
primary	24,924.26	164,694.31	38,998.92	178,803.10	60,828.96	196,611.02
junior	65,311.44	156,827.44	95,066.28	226,692.99	265,173.48	295,019.82
senior	132,442.20	238,187.36	200,569.44	302,155.30	290,767.08	366,428.73
higher education	317,792.04	352,898.78	624,313.80	462,853.44	763,488.84	602,573.24
	Total Transfers Given (in Billion Rupiah*)					
	Private	Public	Private	Public	Private	Public
primary	740.24	4,891.35	1,140.30	5,228.06	1,734.17	5,605.18
junior	465.74	1,118.35	882.09	2,103.42	2,496.39	2,777.37
senior	554.33	996.92	987.62	1,487.84	1,542.29	1,943.61
higher education	644.17	715.34	1,684.17	1,248.61	2,059.61	1,625.52
	Total Transfers Given (in Billion Rupiah*)					
	Private	Public	Private	Public	Private	Public
5 - 12	673.17	4,448.20	1,106.79	4,929.64	1,599.77	5,170.78
13 - 15	455.64	1,345.12	875.29	2,217.92	2,197.45	2,736.63
16 - 19	648.09	1,165.37	1,262.22	1,802.30	2,098.07	2,369.82
> 19	728.57	883.38	1,445.03	1,106.50	1,772.43	1,425.59

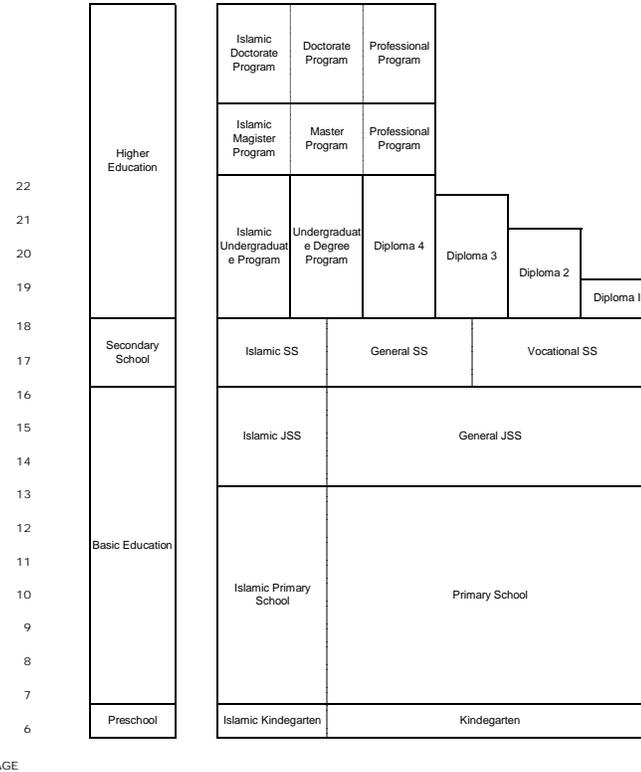
Note: * 1,00 USD = Rp. 2,500,00 (1996 exchange rate)

Figure 3.1 General Education and Islamic Education System in 1950's



Sources: Compulsory Education in Indonesia (Hutasoit 1954)

Figure 3.2 Formal School System based on Law No. 2 1989



Sources: Indonesia Educational Statistics in Brief 2000/2001

Figure 4.1 Private Education Transfers Resources

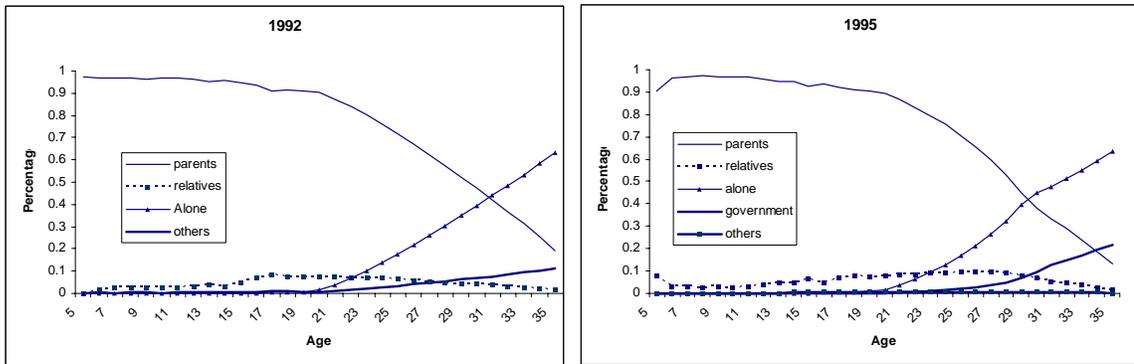


Figure 6.1 Regression result of education expenditures on enrolled age groups: Estimated Coefficients $\hat{\beta}$ of Age group*

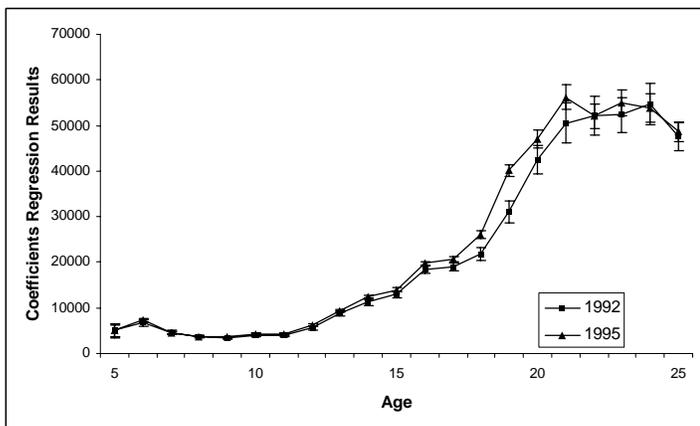


Figure 6.2 Comparison between data and predicted individual education expenditure

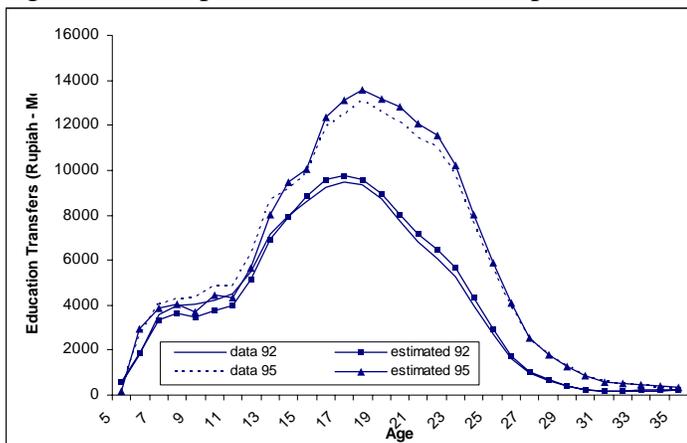
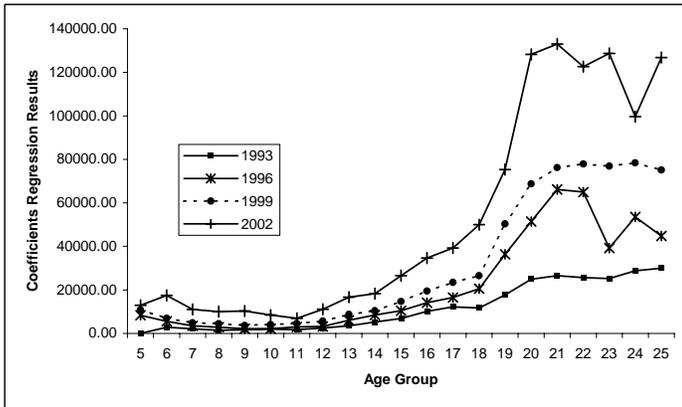


Figure 6.3 Regression results of education expenditures on enrolled age groups: Susenas 1993, 1996, 1999, and 2002



+ regression on average monthly household education expenditure. all coefficients are significant at 99% confidence level. Note: Standard deviation in parentheses.

Figure 6.4 Private Education Transfers Profiles 1993, 1996, and 1999

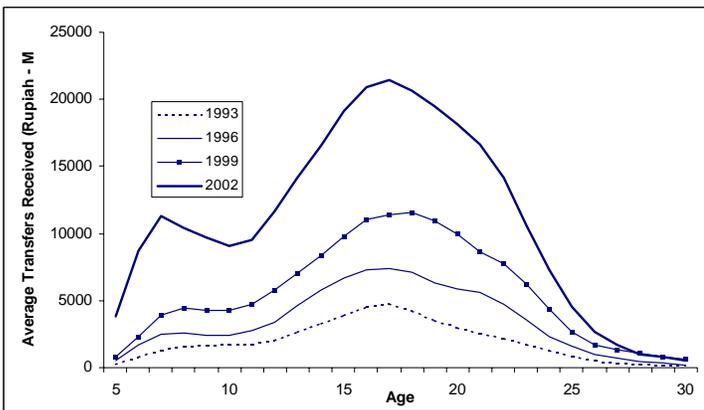


Figure 6.5 Monthly Education Transfers Outflow by Household Head

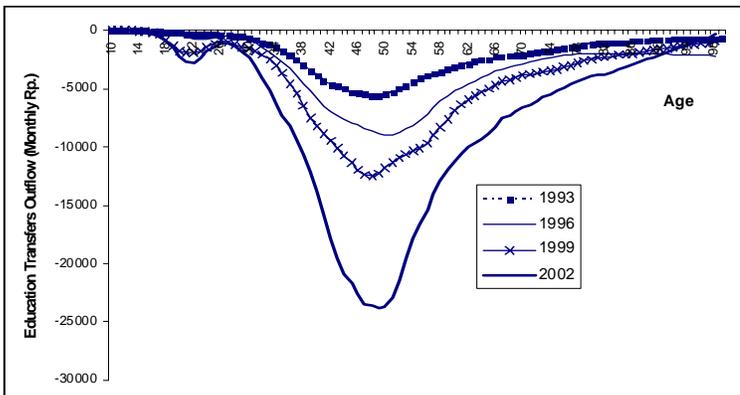
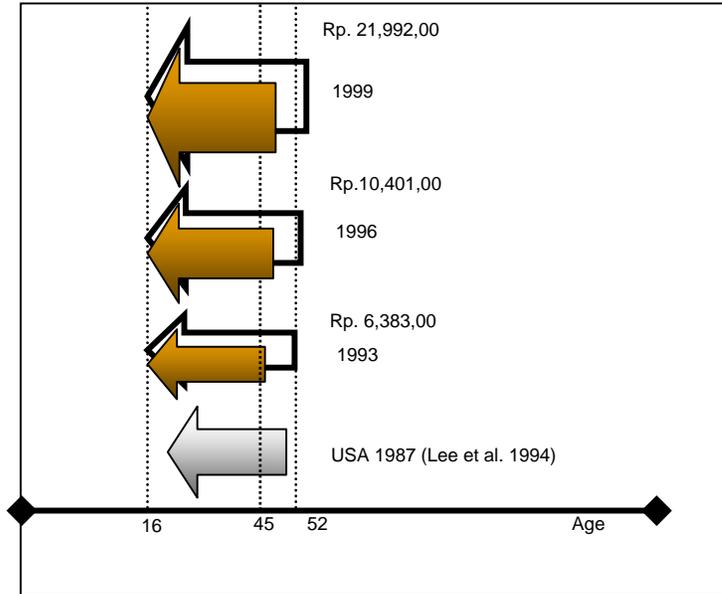


Figure 6.6 Private Education Transfers Flow



Note: Hollow arrow assume that household head as principal earners, while solid arrows indicate taxing the household members.

ⁱ National Transfers Account Project proposal is submitted to National Institute of Health by Mason at the East West Center and Lee at UC Berkeley (2004).

ⁱⁱ I drop subscript j to reduce notation

ⁱⁱⁱ $\hat{\beta}$ is defined as enrolled household member education expenditure share. Direct calculation of individual education expenditures over total household education expenditures indicates individual share as the non-parametric $\hat{\beta}$.

^{iv} I calculate confidence interval on coefficient γ_o as

$$\hat{\gamma}_o \pm t(1 - \alpha / 2; N_{obs} - 2) \sqrt{MSE \sum_{i=1}^{N_{obs}} q_{hi}^2 / N_{obs} \sum_{i=1}^{N_{obs}} (q_{hi} - \bar{q}_{hi})^2}$$

and confidence interval γ_1 as

$$\hat{\gamma}_1 \pm t(1 - \alpha / 2; N_{obs} - 2) \sqrt{MSE / \sum_{i=1}^{N_{obs}} (q_{hi} - \bar{q}_{hi})^2}$$

Coefficient γ_o should be fluctuated around zero, while coefficients γ_1 should be fluctuated around one.

^v Discussion on second assumption of estimation education transfers outflow is not presented in this version. Basically, I establish second assumption that household education expenditures are paid by proportionally taxing labor income of individuals' in the household.

^{vi} See note 5