Distribution of Government Expenditure and Demand for Education Services: The Case of Indonesia

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Abstract

This paper utilizes Benefit Incidence Analysis (BIA) to analyze the incidence of government expenditure on education services to different segments of the population and logistic regression model to estimate demand for the services in Indonesia in 2005.

This paper found that (i) lower-income quintiles have a larger share of enrollment in primary school, whereas for the higher income quintiles enrollment is highest in higher education. (ii) Distribution of expenditure on primary education favors those with a lower-income. On the other hand, expenditure on secondary education attests for a distribution in favor of the higher-income population. Moreover, the expenditure on university education not only favors higher-income group, but also shows a greater inequality than the distribution of personal income. (iii) Income, education level of parents and scholarship have a significant influence on increasing the probability of a child attending school. Age of child and family size, however have a negative correlation with school attendance. It was also found that, gender, teacher-student ratio and school density variables have varied impact on school enrollment across areas and levels of education.

Key words: Benefit Incidence, Demand Analysis, Government Expenditure, Education, Indonesia

1. Background

The government of Indonesia pays a lot of attention to education sector. This can be shown, for example, since the beginning of 2000s, Indonesia has experienced an increasing trend in government expenditure in this sector, receiving 11.4 per cent of total national expenditure in 2001, which increased to 14.3 in 2002, 16.0 per cent, 14.0 per cent and 13.9 per cent, in 2003, 2004 and 2005, respectively. Moreover, the Indonesian government is aiming to achieve a targeted number as mandated by law to allocate a minimum 20 per cent of its budget to the education sector. The decision of Indonesia government to allocate the amount of expenditure to each level of education basically is based on the number of enrolled student in that level. Government does not have information on how their spending is distributed across different types of households or individuals, especially by income

group. The issue of the distribution of education expenditure across income group is important since education is one of the most important factors of human capital development, whereas human capital has been identified as a key determinant of growth and poverty alleviation.

Given the size of social spending in the budget and the desire to enhance the quality of fiscal adjustment while pursuing macroeconomic stability, policy makers are striving to increase the effectiveness of expenditure policy, particularly social spending, including the ability to track all pro-poor spending. This aspect of fiscal policy is regarded as an important challenge when dealing with poverty alleviation programs. Since the poor often have limited access to services that could enable them to escape from poverty, the government is expected to target the provision of such services to them. However, how does one ascertain the extent to which the existing (or an increasing) budget allocated to the poor could actually reach this share of the population? To address this question, a thorough study of budget incidence needs to be carried out to assess to what extent the poor benefit from goods and services provided through the government budget. Establishing the incidence of government expenditure is important because not all expenditures benefit households of different income levels to the same extent. Even those government expenditures intended to benefit low income households may not do so due to poor targeting or because of obstacles to access public services faced by the poor. Therefore, a study of government budget incidence can have a significant contribution to government particularly by providing information and feedback to help improve the effectiveness of programs and policies.

The benefit incidence analysis is useful to determine whether services are reaching those most in need; however, it is less useful for evaluating the factors that act to constrain household or individual use of the services. This requires a behavioral analysis of the response of households to the policies, that is, analysis of the demand for the services. The second part of this study, therefore, seeks to analyze household behavior after the implementation of budget policies, in this case, expenditure for education service, by estimating the demand for the services.

This paper focuses on education expenditure of the Indonesian government in 2005 for two reasons. First, education, in particular, is understood to be a basic service, essential to addressing inequalities in distribution of income and improving the welfare of the poor. Second, Indonesia's constitution states that government is one of the stakeholders responsible for financing education and ensuring that each citizen is provided with education (in particular, basic education)[1]. Although it stipulates that 20 percent of state budget be spent on education, such percentage has never been reached. In 2007, the year of the highest share of education spending in the history of Indonesian state budget, it reached about 11.9 percent. This paper has endeavored to use the most recent available data, which at time of writing is Susenas 2005. Moreover, figures from 2005 are the only data available for budget realization after the implementation of the new budget accounting system[2].

Based on explanation provided in the background above, this paper attempts to answer three

questions (i) what is the incidence of expenditure on education to each different segment of population?; (ii) how much the poor actually benefit from public education spending?; and (iii) what is the household / individual demand on education services?

The remainder of the paper is organized as follows. Section 2 describes literatures reviews, section 3 explains the education system and state budget reform in Indonesia, Section 4 consist of methodology of research and data sources, section 5 assesses the benefit incidence of government expenditure on the education section and the demand analysis of education services, while section 6 offers a conclusion and policy recommendations.

2. Literature Reviews

Studies of benefit incidence of government expenditure on education have been done by numerous researchers. Among others, Selowsky (1979) conducted a survey and a Benefit Incidence Analysis (BIA) of education expenditure in Colombia (South America) and Meerman (1979) in Malaysia. Both of them are pioneers of this method. Selowsky used a country-wide survey of 4,019 households which were designed specially for his research. He used the survey data to trace the beneficiaries of one-third of total government expenditure, which was used for subsidies to education and health sector and the investment in electricity, water and sewerage. He found that the total subsidy to education was distributed evenly across income quintiles, but the subsidy to primary education was highly progressive, and that to higher education was highly regressive. Meerman used the household sample survey developed by the Malaysian department of Statistics. His study included four sectors education, medical care, agriculture, and public utilities (water, electricity, and sewerage) which having a very large public expenditure. In education sector analysis, he also found that the distribution of subsidy to primary education tends to favor lower-income households. In contrast, the subsidy to higher education favored higher-income households.

Demery (2000) estimated the benefit incidence on education spending for Indonesia, Colombia and Cote d'Ivoire as one of his examples in his BIA practitioner's guide paper. In the case of Indonesia, he found that although the poorest quintiles reaped the benefit of education significantly less than their share in total population, it was progressively distributed-in relation to their household income/expenditure. Peter lanjouw et all (2001) did a BIA on education spending in Indonesia using Susenas 1998 data. They found that (i) government spending on primary education had pro-poor distribution; (ii) most of the benefits of spending on junior secondary school accrued to the middle consumption quintiles; and (iii) for senior secondary education, benefits were distributed very regressively. The total transfer to the richest quintile was more than triple that to households in the poorest quintile. Davoodi, Tiongsan, and Asawanuchit (2003), did cross country BIA on education spending, covering 56 nations during the time period 1960–2000. They found that (i) overall spending

on education was on average pro-rich; (ii) spending on primary education was on average pro-poor and progressive; and (iii) spending on secondary and tertiary education primarily benefits the non-poor, with a strong evidence of middle-class capture.

Among others, Glick P et. al. (2000) did demand analysis on education services in Madagascar. They used a permanent household survey carried out in 1993 and 1994. They found that (i) household income and education are important determinants of investments in children's school. It was also revealed that (ii) Gender does not, for the most part of their research, play a role in determining access to education, (iii) rural secondary school enrollments are constrained by lack of access to schools, and (iv) improvement in public primary school quality will have large, pro-poor effects on primary enrollments.

To the best of my knowledge, the study of demand on education services using logistic regression model in Indonesia has not ever done so far. This research also put new variables to be included into the model such as scholarship and scholarship-income cross term variables which have not ever been employed in the previous related researches. Scholarship-income cross term is a very important variable to analyze the distribution system of the scholarship. Moreover, for the benefit incidence analysis, it uses Susenas 2005 data which is the most recent available survey after the implementation of new intergovernmental fiscal transfer system in Indonesia in 2000.

3. Education System and State Budget Reform in Indonesia

3.1 Education System in Indonesia

The Republic of Indonesia enacted a new Law on the National Education System in July 2003. The Law has its foundations in the 1945 Constitution of Indonesia, Article 31, section (1), which states that each and every citizen shall have the fundamental right to education. The Law creates a legal framework for the major educational goals, policies and plans. The key targets include the expansion and equity, the improvement of quality and relevance, and the implementation of autonomy in higher education. The law seeks to open access to education at all levels and all forms (formal, non-formal, as well as informal) for all the citizens of Indonesia. Its main thrust is to make education relevant to societal needs; to develop further community-based education; and to enhance participation by community in supporting basic education. It designs rights and obligations to citizens, parents, community, and government. An outstanding feature of the Law is the implementation of compulsory basic education, free of cost, for all Indonesian citizens. It is provided by law that, "Every seven to fifteen years old citizen shall have the right to receive basic education", provides the Law.

The level of education that includes formal school system consists of basic education, secondary education, and higher education. Apart from the levels of education mentioned above, pre-school education is also provided. Out-of-school education can be held at outside schools which usually are

set up in the village square or fields and provided by governmental and non-governmental agencies. Basic education is the foundation for secondary education. It takes the form of primary schools, that is, *Sekolah Dasar* as well as *Madrasah Ibtidaiyah* (an Islamic Primary School), or other schools of the same level, and junior secondary schools, that is *Sekolah Menengah Pertama* as well as *Madrasah Tsanawiyah* (Islamic General Junior Secondary School), or other schools of the same level. Secondary education is the continuation of basic education. It comprises general secondary education and vocational secondary education and takes the form of senior general secondary schools, that is, *Sekolah Menengah Atas* (SMA) as well as *Madrasah Aliyah* (an Islamic General Senior Secondary School), and senior vocational secondary schools, that is, *Sekolah Menengah Kejuruan* (SMK), as well as *Madrasah Aliyah Kejuruan* (an Islamic vocational Senior Secondary School), or other schools of the same level. Higher education is a level of education after secondary education consisting of diploma, bachelor (*sarjana*), masters and specialized postgraduate programs, and doctorate programs imparted by a higher education institution. Higher tertiary education consists of institutions specialization (*sekolah tinggi*) including academy, polytechnic, college, as well as university.

Moreover, according to the law, financing education shall be the shared responsibility of the government, local governments, and community, and that the source of education funds shall be determined based on the principles of equity, adequacy, and sustainability. Education funds, excluding salary of educators and service education expenditure, are allocated at a minimum of 20 per cent of the National Budget (APBN) and a minimum of 20 per cent of the Regional Budget (APBD). The salary of teachers and lecturers appointed by the government is allocated by the National Budget (APBN). Education funds provided by the Government and local governments to units of education shall be in the form of a grant in accordance with the regulations.

3.2   Indonesia State Budget Reform

There were two major changes of the state budget accounting system in Indonesia in the post-crisis era. The first change was changing of state budget format from T-account to I-account format. Starting from fiscal year (FY) 1999/2000 the purpose is to increase transparency, efficiency, and effectiveness, especially in budget deficit control. The second one was adjustment in the expenditure format that had been made to facilitate the application of a unified budget system, which comprised the previously separated current expenditure and development expenditure, starting in FY 2005.

State budget utilized T-account from FY 1969/1970 to FY 1999/2000. The shortcoming of this format is that it does not provide clear information on deficit control and lacks of transparency. Therefore, starting from FY 2000, state budget format was changed into I-account, in compliance with Government Finance Statistic (GFS)[3]. The objectives of such change are to: (i) increase transparency in budget formulation; (ii) facilitate analysis, monitoring, and control in budget implementation and management; (iii) assist cross-country comparative analysis; and (iv) enable a more transparent

calculation of balance fund to be distributed by central government to local government as warranted by Law 25/1999 on Central and Local Fiscal Balance.

The second change was implemented starting from FY 2005: the I-account format underwent several adjustments in the expenditure side as warranted by Law 17/2003 regarding State Finance. One purpose of the adjustments is to increase state expenditure management transparency and accountability through reducing duplication of strategic plan and budgeting in state expenditure, another function is to create linkage between actual output and outcome. Another purpose includes complying with an internationally approved classification system. The new format still separates central government expenditure from local government expenditure. However, as a result of state budget format adjustment, several changes have been made in central government expenditure. One of the changes is the implementation of classification of expenditure by function, sub-function and program to replace classification according to sector, sub-sector and program. By this new classification, the distribution analysis of government expenditure and the demand analysis on education sector can be based on education level which is in line with the new national education system law.

4. Methodology of Research and Data Source

4.1　Benefit Incidence Analysis

This study utilizes a Benefit Incidence Analysis (BIA) to analyze the distribution of education expenditure. It is an easy-to-use tool for ex ante design as well as ex post monitoring and evaluation of effectiveness of social spending program. It brings together elements of the supply of public services and the demand for them. It also can provide valuable information on efficiencies/ inefficiencies and equities /inequities in government allocation of resources for social services and on the public utilization of these services.

The BIA approach was pioneered by twin World Bank studies by Selowsky and Meermen (1979). The main goal of this method is to identify who benefits from public spending and by how much. The essence of the approach is to use information on the cost of public goods and services together with information on their use by different income groups to estimate the distribution of benefits. Individual or household beneficiaries are typically grouped by income level but they may also be grouped by other criteria such as geographical area, ethnic group, urban and rural location, gender. Information on individual or household use of the public services is typically obtained from surveys.

There are two assumptions in the BIA analysis which could be the limitation of the model. However, at the same time they could be the advantage of the model, especially in dealing with the data limitation problem that is usually faced by developing countries such as Indonesia. First, the budget expenditure at each level of education is assumed to be allocated equally to each student. Of

course, it is better to know the actual allocation of the expenditure received by each student. Unfortunately such an ideal data can not be obtained, especially in many developing countries, including Indonesia. The model, therefore, is suitable to analyze the distribution issue in a country which has such data limitation. Second, the model assumes that the benefits of public spending of a particular government services, in this case is education, enjoyed by a group depend on the use of services by that group. It uses the share of student[4] coming from different income group in each level of education as a proxy of the service utilization by different group. Such information would not be available in ministry of education's records, but only can be estimated through a household survey data. An easy understandable and applicable approach within data limitation that could bring together elements of the supply of public services and the utilization of the services is the most advantage of the model.

Benefit incidence analysis can be illustrated by some simple algebra, as applied to the case of education spending. Benefit from government expenditure on education level i (primary, secondary, and university)[5] accrued to group j[6] is estimated as

$$X_{ij} = \frac{E_{ij}}{E_i} S_i = \frac{S_i}{E_i} E_{ij} \tag{1}$$

Where E_{ij} represents number of students enrolled in level i from group j and S_i represent government spending on education in level i. S_i/E_i is the unit cost of providing education in level i. Therefore, total benefit from government expenditure on all education accrued to group j is

$$Xj = \sum_{i=1}^{n} X_{ij} \tag{2}$$

by substituting equation 1 into equation 2, it can be arranged as

$$Xj = \sum_{i=1}^{n} E_{ij} \frac{S_i}{E_i} = \sum_{i=1}^{n} \frac{E_{ij}}{E_i} S_i \tag{3}$$

The method involves a process of at least four steps that can be easily implemented using popular spreadsheet programs.

1. Obtain the average unit cost of providing a particular public service by dividing government spending on the service by the total number of users of the services: S_i/E_i. Government spending must be based on actual expenditure and not on budget allocation;

2. Rank the population from poorest to richest using a welfare measure and aggregate them into groups with equal numbers of group member. Total monthly expenditure of household is taken as a proxy for welfare measure;

3. Obtain the number of enrolled students in each level of education from each group. Step 2 and step 3 are calculated using survey data; and

4. Derive the distribution of benefits by multiplying the average benefit by the number of users in each group.

4.2   Logistic Regression Model

Moreover, this research utilizes logistic regression model to estimate the demand for the services,. The logistic distribution (Logit) is used in the case when the dependent variable of the model is a dichotomous variable, that is, in this model, 1 if parents send their child to school and 0 if vice-versa. It is used because (i) the predicted value of the dependent variable in logistic model is the probability of a particular choice being made, P, should satisfy $0 \leq \overline{P} \leq 1$.   Unfortunately linear regression does not ensure that is so. (ii) the observed value does not follow a normal distribution with mean P, but , in case of logistic regression, is based on the cumulative logistic probability function (Pindyck and Rubinfeld, 1991) which is specified as

$$P_i = F(Z_i) = F(\alpha + \beta X_i) = \frac{1}{1+e^{-z_i}} = \frac{1}{1+e^{-(\alpha+\beta X_i)}}$$

multiply both sides by $1+e^{-z_i}$ to get $(1+e^{-z_i})P_i = 1$ dividing by P_i and then subtracting by 1 leads to

$$e^{-z_i} = \frac{1}{P_i} - 1 = \frac{1-P_i}{P_i}$$

since $e^{-z_i} = \dfrac{1}{e^{z_i}}$ then $e^{z_i} = \dfrac{P_i}{1-P_i}$

Finally, by taking natural logarithm of both side

$$Z_i = \ln\left[\frac{P_i}{1-P_i}\right] = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \cdots + \beta_r X_{i_r}$$

The dependent variable in this regression is the logarithm of the odds that a particular choice will be made.

4.3   Data Sources

Three sets of data are used in this paper.

a. National Socioeconomic Survey (Susenas), BPS- statistics Indonesia, 2005. BPS-statistics of Indonesia has been conducting Susenas since 1963. One of the objectives of Susenas is to gather complete, accurate and timely data on important characteristics of the population, particularly those closely related to measurement of well being in various categories of the population (Surbakti, 1995). The key aim of the survey is to gather data from households to make available sufficient data in order to examine various social issues. Susenas 2005 covers more than one million respondents from more than 250,000 households. The survey has been conducted in 30 provinces, 407 districts, 4,626 sub-districts and 14,565 villages in Indonesia. In this research, the survey is used to estimate (i) the welfare measure, (ii) the number of enrolled students and (iii) dependent and some independent variables of demand analysis.

b. Data of realization of government expenditure on education in 2005, from the Ministry of Finance.

c. Data of enrollment in each level of education, the number of schools and teachers has been obtained from the Ministry of Education. The Ministry of Education provides data on the number of students enrolled in each level of education, but it does not give information about the welfare status of each student. Therefore, as mentioned above, the number of enrolled students in each level education coming from each income group is estimated using Susenas data. Data on enrolled students, obtained from the Ministry of Education, and figures on the realization of government expenditure are used to calculate the public expenditure per student each year for each level of education. The number of schools and the number of teachers is used to estimate school density and teacher student ratio respectively.

5. Estimation Result

5.1　Benefit Incidence Analysis of Government Expenditure on Education

The unit cost of providing education services in each level of education is estimated by dividing the realization of government expenditure by number of student enrolled in each level of education. Table 1 shows that the estimated government expenditure per student for 9-year compulsory basic education[7] in 2005 was Rp. 317,019. For secondary school, it was Rp. 627,920, almost twice the amount as that allocated for primary school. University expenditure per student reached Rp. 1,967,714, six times larger than the cost per student in primary school. These values are unsurprising since the higher the level of education the more expensive the cost of services

Table 1 Total Government Expenditure on Education, School Enrollment and Estimated Expenditure Per Student, by Level of Education, 2005

	Total Expenditure* (*billions of Rupiah*)	Enrollment** (*thousands*)	per student (*Rupiah*)
Primary School***	12,310	38,832	317,019
Secondary school	3,963	6,311	627,920
University	7,056	3,586	1,967,714

Note:
* 　Realization of expenditure reported by ministry of finance
** 　Actual data reported by ministry of education
*** Primary school consists of elementary school and junior high school. Both schools are considered as 9 years compulsory education in Indonesia.

Furthermore, it is estimated that lower-income quintiles had a larger share of enrollment in basic education, whereas, in higher education, predominance is true for the higher income quintiles. Table 2 shows the share of the expenditure for each level of education and each level of income. The share of expenditure is assumed to follow the share of student enrolled in each level of education coming

from each quintile. Population is ranked from the lowest to the highest, based on their monthly average expenditure per capita which is, in this paper, used as a proxy of income per capita. Next, ranked population is grouped into 5 quintiles, such that quintile 1 has the lowest average income per capita. Table 2 shows that in 2005, 23.8 percent of total students enrolled in basic education belonged to the poorest quintile, while only 4 percent of total students enrolled in university came from this quintile. Nevertheless, only 15,0 percent of total students enrolled in basic education came from the richest 20 percent of the population, while 60,0 percent of university students belonged to this quintile. The observed disparity can be mainly attributed to the fact that (i) poor families tend to have more children than the rich ones, but (ii) most of them cannot afford to send their children to higher, more expensive levels of education.

Multiplying per student government expenditure in each level of education by the number of students enrolled in each level of education from each income group, we can estimate the benefit incidence of government spending on each level of education for each income group. The estimation assumes that the unit cost of providing the service is equally distributed across students in the same level of education. It means that each student in a level of education, regardless of his or her income level, gender, geographical location etc, benefits equally government expenditure. Table 2 shows that the poorest quintile received Rp. 2.9 trillion of government spending on basic education, while the richest quintile received only Rp. 1.8 trillion out of Rp. 12.3 trillion of total government spending on basic education in 2005. On the other hand, from Rp. 7.0 trillion of government spending on university education, only Rp. 0.28 trillion was designated to the poorest quintile while the richest quintile received Rp. 4.2 trillion. Per capita expenditure is calculated by dividing the government

Table 2 School Enrollment and Distribution of Expenditure on Education, by Level of Education and Income Group, 2005

| Population Quintile	Basic Education			Secondary			University			All Education		
	Per capita	% of Total Exp. (E_{ij})	Expenditure (billions of Rp)	Per capita	% of Total Exp. (E_{ij})	Expenditure (billions of Rp)	Per capita	% of Total Exp. (E_{ij})	Expenditure (billions of Rp)	Per capita	% of Total Exp. (X_j)	Expenditure (billions of Rp)
1	66,930	23.8	2,930	9,506	10.5	416	6,448	4.0	282	82,884	15.5	3,628
2	62,712	22.3	2,745	13,218	14.6	579	9,188	5.7	402	85,118	16.0	3,726
3	57,931	20.6	2,536	17,292	19.1	757	17,409	10.8	762	92,632	17.4	4,055
4	51,463	18.3	2,253	22,543	24.9	987	31,433	19.5	1,376	105,438	19.8	4,615
5	42,183	15.0	1,847	27,975	30.9	1,225	96,715	60.0	4,234	166,873	31.3	7,305
Total	56,244	100.0	12,310	18,107	100.0	3,963	32,238	100.0	7,056	106,589	100.0	23,329

Source: Susenas 2005, author calculation

expenditure distributed to a level of education of a group in by the number of population in that group.

Utilizing information in table 2, we may draw the Concentration Curve[8] of the distribution of government spending on each level of education. Figure 1 shows the Concentration Curves of the distribution of expenditure on each level of education compared with the Lorenz Curve[9] of income distribution. <u>The horizontal axis shows accumulated percentage of population, ordered according to population's per capita income, and the vertical axis shows accumulated percentage of government expenditure on education</u>. For example, the concentration curve of basic education expenditure shows that 20 percent of poorest group of population enjoyed about 24 percent of expenditure on basic education. It also means that the rest of expenditure, about 76 percent is distributed to the rest of 80 percent of richer population.

The concentration curve for basic education is above the 45 degree line showing that the distribution of expenditure on basic education was in favor of lower-income population. However, the distribution of total expenditure on education and of expenditure on secondary education were in favor of higher-income population (both lines are below the diagonal). Moreover, distribution of expenditure on university education not only favored higher-income population, but also showed a level of inequality greater than the one displayed by the distribution of personal income (the Lorenz curve of

Figure 1 Distribution of Government Expenditure on Education and Distribution of Income, 2005
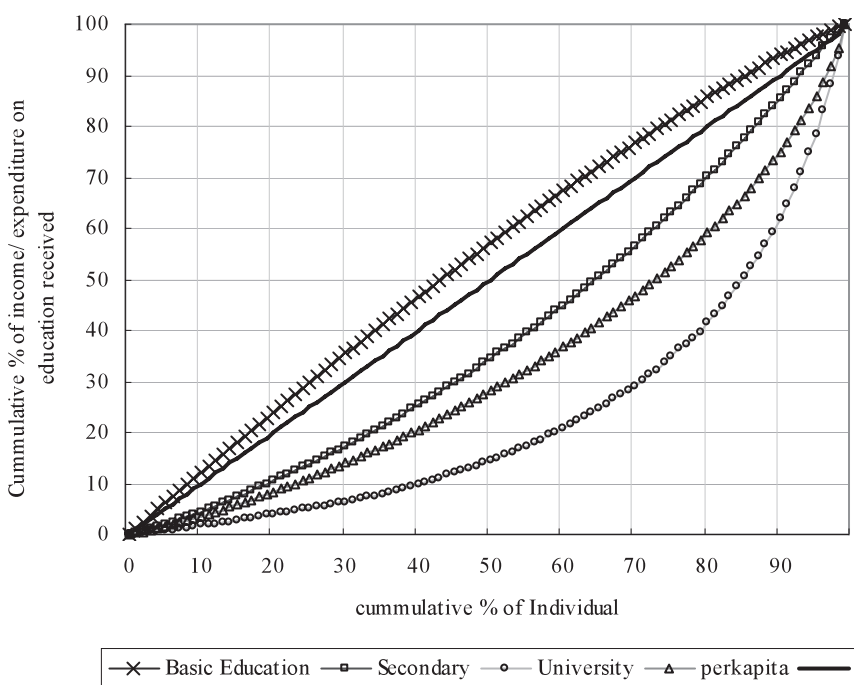
Source : Author's Calculation, estimated using Susenas data

expenditure on university is not only below the diagonal line, but also below the Lorenz curve of per capita income).

5.2　Analysis on Demand of Education in Indonesia

The decision of parents to send or not to send their children to school is a proxy of demand for schooling (education services).　The model estimates that demand for education depends on monthly household income (LogInc), father's education (FE), mother's education (ME), family size (FE) which are included as household characteristics.　Moreover, individual characteristic includes age (Age) and gender (Gdr).　While scholarship (Sch), school density (Sden) and teacher-student ratio (TSratio) are community characteristics.　The model specification could be written as follows

$$Z_i = \ln\left[\frac{P_i}{1-P_i}\right] = C + \beta_1 LnInc + \beta_2 FE + \beta_3 ME + \beta_3 FamZ + \alpha_1 Age + \alpha_2 Gdr + \alpha_3 Sch +$$
$$\delta_1 Sden + \delta_2 TSratio + \sigma_1 Location + \sigma_2 CrosIncSch$$

where

Coefficient	Variable	Explanation	
C		Intercept	
HouseHold Characteristics			
β_1	LogInc	Log monthly household income	
β_2	FE	Father education	1 to 5
β_3	ME	Mother education	1 to 5
β_4	FamZ	Family size	
Individual Characteristics			
α_1	Age	Age	
α_2	Gdr	Gender	male = 1, female = 0
α_4	Sch	Scholarship	Received scholarship = 1, not received = 0
Community Characteristics			
γ_1	Sden	School density	1 to 3 (scale)
γ_1	Tsratio	Teacher student ratio	1 to 3 (scale)
Others			
σ_1	Location	Location of respondent	urban = 1, rural =0
σ_2	CrossIncSch	Income scholarship cross-term	

Table 3 shows result of logistic regression of demand for elementary school education in Indonesia, 2005.　It shows that the probability of being enrolled in elementary school increases as

income increases. Rural areas show a higher coefficient than urban areas, implying a higher effect of income on elementary enrollment in rural areas than urban. The higher the child's parents education level the higher probability of enrollment. Mother's education, especially in rural areas, is a more important determinant of elementary school enrollment than father's education. Family size also has an important impact on enrollment. The larger the family members the lower the probability of enrollment implying a competition of resources.

The probability of being enrolled increases with age. This is inconsistent with the hypothesis that increasing age corresponds to increasing potential labor income resulting in children possibility of being withdrawn from school as they grow. The negative sign of gender coefficient shows parental preferences for girls education. Positive sign of scholarship coefficient shows scholarship increases the probability of school enrollment. The impact is stronger in rural than urban areas.

Statistically insignificant school density and teacher student ratio variables may indicate that parents do not put consideration on these variables when they send their children to elementary school. It may because Indonesia already has a sufficient number of elementary school across the countries which have generally the same quality.

Positive significant coefficient of location indicates that children in urban area have more chance to be sent to school than they who live in rural area. It also shows that there is a significant behavioral difference between the two areas. Positive sign of income variable, positive sign of scholarship variables and negative sign of income-scholarship cross term variable indicate that distribution of scholarship on basic education to richer income household has less impact to increase the probability of a child belong to richer households to be sent to school then to the poorer one. It may indicate

Table 3 Logistic Regression : Demand for Elementary School Education, Indonesia, 2005

Independent Variable	All			Urban			Rural		
	B		Exp(B)	B		Exp(B)	B		Exp(B)
Ln of income	0.56	***	1.75	0.54	***	1.71	0.59	***	1.80
Father education	0.25	***	1.28	0.23	***	1.25	0.26	***	1.30
Mother eductaion	0.29	***	1.34	0.22	***	1.25	0.34	***	1.41
Family size	−0.15	***	0.86	−0.13	***	0.87	−0.15	***	0.86
Age	0.27	***	1.32	0.27	***	1.31	0.28	***	1.32
Gender	−0.18	***	0.84	−0.19	***	0.83	−0.17	***	0.84
Scholarship	4.92	***	136.45	4.35	**	77.52	5.68	***	292.35
School density ratio	−0.01		0.99	−0.01		0.99	0.06		1.06
Teacher-student ratio	0.00		1.00	0.00		1.00	0.00	**	1.00
Location	0.09	***	1.10	-	-	-	-	-	-
Crossterm Inc-scho	−0.74	***	0.48	−0.63	***	0.53	−0.87	***	0.42
Constant	−7.43	***	0.00	−6.78	***	0.00	−7.94	***	0.00

Note: ***Coefficient is significant at less than 1%

      **Coefficient is significant between 1% to 10%

distribution of scholarship for elementary school level should be targeted to poorer household or in other word, it is better to distribute the elementary school scholarship based on need basis.

Table 4 presents the logistic regression result of junior high school demand, Indonesia, 2005. The probability of being enrolled in Junior high school also increases as income increases. Rural areas also have higher coefficient than urban. The higher the education levels of the parents the greater the probability of enrollment for the child. The father's education, however, in case of junior high school is a more important determinant than mother's education. The larger the family member the lower the probability of junior high school enrollment.

The probability of being enrolled increases at a decreasing rate with age. This is consistent with the hypothesis that increasing age corresponds to increasing potential labor income which means children may be withdrawn from school as they grew. Negative sign of gender coefficient in rural region shows parental preferences for girl's education. This may imply that boys in this age group, especially in rural areas, have more potential labor income than girls. However, an insignificant gender coefficient in urban areas may indicate there were no gender preferences of parents to send their children to school. Scholarship also has positive coefficient, implying the importance of scholarship for school enrollment.

School density variable has a positive significant sign in urban areas, and also positive but insignificant coefficient in rural areas. It may be because the transportation cost to school is higher in urban than rural areas. Negative sign of teacher-student ratio indicates higher school quality also increases the probability of enrollment in junior high school level, especially in urban area.

Similarly to elementary school demand, junior high school demand also has a positive significant

Table 4 Logistic Regression: Demand for Junior High School Education, Indonesia, 2005

Independent Variable	All		Urban		Rural	
	B	Exp(B)	B	Exp(B)	B	Exp(B)
Ln of income	0.54 ***	1.71	0.43 ***	1.54	0.61 ***	1.83
Father education	0.43 ***	1.54	0.37 ***	1.45	0.46 ***	1.59
Mother eductaion	0.38 ***	1.47	0.33 ***	1.39	0.42 ***	1.53
Family size	−0.12 ***	0.89	−0.15 ***	0.86	−0.11 ***	0.90
Age	−0.57 ***	0.57	−0.55 ***	0.58	−0.57 ***	0.56
Gender	−0.07 ***	0.93	0.06	1.06	−0.11 ***	0.89
Scholarship	1.93 ***	6.92	2.97 **	19.56	2.30 ***	9.95
School density ratio	0.08 ***	1.08	0.13 ***	1.14	0.26	1.29
Teacher-student ratio	−0.01 ***	0.99	−0.02 ***	0.98	0.00	1.00
Location	0.16 ***	1.17	-	- -	-	- -
Crossterm Inc-scho	−0.22 **	0.80	−0.39 **	0.67	−0.29 **	0.75
Constant	1.35 ***	3.86	3.32 ***	27.59	0.30 ***	1.35

***Coefficient is significant at less than 1%
**Coefficient is significant between 1% to 10%

coefficient of location variable and a negative sign of income-scholarship cross term variable. However, junior high school income-scholarship cross term variable has a smaller coefficient than one belonging to elementary school. It may indicate that the impact of scholarship to the probability of school enrolment is lower at junior high school level.

Table 5 presents the logistic regression of determinant of senior high school enrollment. The probability of being enrolled in senior high school also increases as income increases. Rural areas also have a higher coefficient than urban. Parent's education increases the probability of enrollment with the father's education, as in the case of junior high school, being a more important determinant than mothers education. Family size also has an important impact on senior high school enrollment.

The probability of being enrolled increases at a decreasing rate with age. Positive sign of gender coefficient in urban area shows parental preferences for male children advancing to higher education. Scholarship has strong positive significant coefficient in rural regions but is insignificant in urban area. These indicate that scholarship is a very important determinant of senior high school enrollment in rural areas. A positive sign of school density ratio in rural areas may be because most senior high schools are located in relatively urban areas, therefore parents in rural areas put attention on the availability of the school since they need to consider transportation costs or if the children has to live away from home, accommodation rental costs.

As with other levels of education, senior high school also has positive significant coefficient of location. Income-scholarship cross term variable also shows a negative sign in rural area and positive sign in urban and in overall, the coefficients of the variable are less than that of to elementary and junior high school. This may suggest that (i) distribution of scholarship on senior high school in urban

Table 5 Logistic Regression: Demand for Senior High School Education, Indonesia, 2005

Independent Variable	All			Urban			Rural		
	B		Exp(B)	B		Exp(B)	B		Exp(B)
Ln of income	0.39	***	1.47	0.17	***	1.18	0.60	***	1.82
Father education	0.37	***	1.44	0.35	***	1.42	0.39	***	1.47
Mother eductaion	0.25	***	1.28	0.18	***	1.20	0.34	***	1.40
Family size	−0.06	***	0.95	−0.09	***	0.92	−0.05	***	0.96
Age	−0.63	***	0.53	−0.71	***	0.49	−0.60	***	0.55
Gender	0.09	***	1.09	0.21	***	1.23	0.02		1.02
Scholarship	1.13	**	3.11	0.16	**	1.17	3.25	***	25.88
School density ratio	0.09	***	0.92	0.00		1.00	0.03	***	0.97
Teacher-student radio	0.01	***	1.01	0.01	***	1.01	0.01	***	1.01
Location	0.23	***	1.26	-	-	-	-	-	-
Crossterm Inc-scho	−0.11	**	0.90	0.05	**	1.05	-0.47	***	0.63
Constant	4.17	***	64.44	8.95	***	7688.00	0.50	***	1.65

***Coefficient is significant at less than 1%
**Coefficient is significant between 1% to 10%

area should be based on merit, with only more intelligent students being able to get the scholarship, (ii) however, in rural areas, the distribution should be based on a needs basis. (iii) Moreover, the overall impact of scholarship to the probability of senior high school enrolment is lower than in the previous level of education.

6. Conclusions and Policy Recommendations

6.1   Conclusion

This research intends to be the first research using logistic regression model to analyze the demand for education services in Indonesia. The model includes the scholarship and the income-scholarship cross term variables which have not ever been employed in the previous researches. Moreover, it uses susenas 2005 data to analyze benefit incidence of education expenditure in Indonesia. The susenas 2005 is the most recent available survey after the implementation of new intergovernmental fiscal transfer system in Indonesia in 2000.

Lower-income quintiles have a larger share of enrollment in basic education, whereas at higher levels of education, such predominance is true for higher income quintiles. In most education levels, government spending is regressive, meaning that rich and middle-income groups are the main beneficiaries.

Income, parent's education, family size, age, and scholarship have a significant influence on demand for education. Gender, teacher-student ratio and school density give varied impact to school enrollment across areas and levels of education. Household income is a very important determinant of school enrollment. It was shown in this study that in all levels of education, the probability of being enrolled in school increases as income increases. Moreover, the probability of being enrolled as income increases is higher in rural areas than urban. In general, parent's education increases the probability of enrollment, which may reflect the income potential of the household and also the attitude of the family towards education. Scholarship has a significant impact on increasing the probability of school enrollment. The impact is higher in rural than urban areas. The larger the family size, the lower the probability of enrollment, implying competition for resources. The probability of being enrolled in junior and senior high school increases at a decreasing rate with age. However, positive coefficient of age variable in elementary level may imply that parents have not yet considered potential labor income for elementary school age range. It is assumed that the lower the teacher-student ratio, the higher the school quality. Negative sign indicates that higher school quality increases the probability of enrollment. In all but a few cases, school density has positive sign. It indicates that higher school availability increase the probability of school enrollment. In most cases, especially at elementary and junior high school level, income-scholarship cross term variable has negative sign which may indicate the distribution of scholarship to richer income households has less

impact on increasing the probability of a child belonging to a rich family being sent to school than a child belonging to a poorer one. It may also indicate the distribution of scholarship for elementary and junior high school level should be targeted at poorer households or should be decided on needs basis.

6.2   Policy Recommendation

Given the size of educational spending in the budget, governments should place more emphasis on expenditures for basic education level. A bigger share of disbursements on basic schooling characterizes a pro-poor budget, since it was proved that expenditure on this level of education is in favor of the lower-income share of the population.

A significant positive coefficient of household income and scholarship variables shows the importance of these variables to increase the probability of school enrollment. Therefore, putting high priority on scholarship is a very important policy for raising school enrollment. This may increase the opportunity of children from low-income household to access schools. Moreover, the distribution of scholarships, especially for elementary and junior high school should be targeted to the poorer households or in other word on needs basis; however, it is not necessary for senior high level. Increasing the number of schools and teachers is also a very important policy to increase school enrollment. Increasing the number of schools means increasing the accessibility of the schools. Increasing the number of teachers may increase the quality of education. Finally, the government should continue its family-planning policy which it has been running since 1970s, since it will create small-prosperous families. Moreover, a children from smaller families has a higher probability of attending school than children from big families.

Notes

1   1945 constitution of Indonesia, the fourth amendment, article 31. Indonesia has implemented 9 years compulsory education.

2   Detailed explanation of the new budget accounting system is provided in section 3.2.

3   The GFS system was developed by International Monetary Fund. It is designed to provide statistics that enable policymakers and analysts to study developments in the financial operations, financial position, and liquidity situation of the general government sector or the public sector in a consistent and systematic manner.

4   Student is a person who attends school, or in other word, a person who utilizes education services.

5   Spending on education may occur on more than three levels, but this paper focuses on the three traditional levels as the majority of studies have done.

6   Population is ranked from poorest to richest using per capita expenditure which are aggregated into quintile

7   Indonesia since 1994 defines compulsory basic education as nine years: six years of primary/elementary education (for ages 7 – 12) years and three years of junior high school (ages 13 – 15 years). It is referred as "basic education" in this paper.

8   The concentration curve provides a means of assessing the degree of income-related inequality in the distribution of a other variables, i.e. health and education. The concentration curve plots the cumulative percentage of the health or education variable (y-axis) against the cumulative percentage of the sample, ranked by

　　living standards, beginning with the poorest, and ending with the richest (x-axis).

9　The Lorenz curve is a graphical representation of the cumulative distribution function of a probability distribution; it is a graph showing the proportion of the distribution assumed by the bottom $y\%$ of the values. It is often used to represent income distribution, where it shows for the bottom $x\%$ of households, what percentage $y\%$ of the total income they have. The percentage of households is plotted on the x-axis, the percentage of income on the y-axis. It can also be used to show other distribution. In such use, many economists consider it to be a measure of social inequality. It was developed by Max O. Lorenz in 1905 for representing income distribution.

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