THE BUDGET CALCULATION WITH TWO-PHASE REGRESSION TO ESTIMATE THE AFFORDABLE COSTS OF EDUCATION IN SERANG CITY

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Abstract

In the era of regional autonomy, the costs of basic education is the responsibility of the district/city. The dominant factors that triggered the education expenses consist of teacher salaries, employer salaries, material and operational costs, and administrative costs. The calculation of basic education costs in this study is focusing on all Junior High School (SMP) in Serang city, as many as 56 schools, consisting of 23 public schools and 33 private schools. This study began with the budget review to estimate the School Budget Plan (RAPBS). It was

conducted with the aim to estimate the costs of education over the next five years. Estimated costs werecalculated by the method of regression trend exponentially through two phases. To achieve these objectives, the empirical method was used with survey approach. Based on a review of all RAPBS, every component in every school has a different fee scale. The results of budget estimation for junior high schools in Serang City are in the range of Rp.6.131.250.000-Rp.6.699.240.000; with a unit cost of education per student per year is Rp.455.556-Rp.517.378.

Keywords

Cost Estimation, Trend Exponentially, Unit Cost of Education, Serang City

1. Introduction

Education in Indonesia consists of three levels, namely higher education, secondaryeducation, and basic education. Secondary education consists of Senior High School and Vocational High School, while the basic education consists of Elementary School (SD) and Junior High School (SMP). In the era of regional autonomy, the cost of secondary education is the responsibility of the Provincial Government, while primary education became the responsibility Regency/Municipal Government.

Serang as one of the cities in Banten province has as many as 56 junior high schools, which consists of 23 public schools and 33 private schools. The number of junior high school students in Serang City in each school is different, between 231-1141 students. Differences in the number of students have implications for the number of teachers in each school. The average ratio of teachers to students at 1:22 while spreading quite fairly evenly with a range of 15-29 students per teacher. Furthermore, differences in the number of students and teachers have implications for the cost of education for each school.

In calculating the amount of the costs of education, the public junior high schoolsare entirely the responsibility of the City Government, while private junior high schools sharethe responsibility between the Municipal Government and the school foundations. The charges for each school can be seen at theSchool Budget Plan (RAPBS) made by each school principal. In RAPBS, it appears some of the components to be taken to school as well as the amount of the costs. In calculating the cost of education, it is highly dependent on the number of teachers and students in each school.

The cost of education is one important aspect in the cycle of educational activities. The cost of education is a nominal amount that must be spent to reach people or be a part of education. Richanson in Ghazali (2000a) concept education expenses are translated directly into the cost approach, which consists of administrative costs, teaching, operation, building and

completion. Furthermore Koch in Ghazali (2000b) said that education costs consist of direct costs of students, public expenditure and revenue lost in implementing education (leraning forgone).

In practice, the financing of education is divided into two, namely the direct financing and indirect financing. The direct financing is the cost element that has a direct link with the volume of work listed in item payments or become a permanent component of learning outcomes. Component of direct costs consist of wage costs, operating equipment, and material. The indirect financing is the cost elements that are not directly related to the magnitude of the volume of the physical components of learning outcomes, but has contributed to the completion of learning activities. In addition, the categories in indirect costs include overhead costs, taxes, general expenses, and the cost of risk. These costs, will be the basis of the analysis in the budget calculation for estimating the cost of education.

Estimating the cost of providing education units required a cost analysis concept. For this purpose, the examined matters related to: (1) the factors that trigger costs in the education unit (2) those factors traced from beginning to generate an output, and (3) theensuring effectiveness of internal an organization of education.This study is an analysis of the cost of education for junior high schools in Serang City. The research was conducted in order to estimate the magnitude of the cost of providing secondary education in Serang City.

2. Components and Analysis of Education Costs

2.1 Components of Education Costs

Education is a cost component unit costs to be incurred by each school with the aim of meeting certain requirements within a certain time anyway. Fatah (2002) split the cost of education of four components namely the implementation of the test, improved educational facilities, student guidance and welfare activities. Components of education costs are related to investment funds, personnel and operations that exist in the budget, as shown in Table 1.

Table 1: *Components of Education Costs*

No	Components of Education Costs
1	Increase in the learning process
2	Maintenance and replacement of education facilities and infrastructure
3	Procurement of learning tools
4	Development of educational personnel
5	Cost of coaching, monitoring, control and reporting

6	School households
7	Welfare
8	Increased coaching student activities
9	Budjeting procedures
10	Management of schools
11	Coaching students
12	School facilities
13	Classroom facilities
14	Maintenance
15	Procurement of teaching materials
16	Financial accounting procedures
17	Learning, warehousing and distribution
18	Increased ability to master science and technology
19	Government policies to accommodate all children aged 7-12 years in the basic education level and the success of the 9-year compulsory
20	Demand of the people for improvements in the national education system
21	Slow rate of development of education
22	Procedures for checking
23	Procedures for investment

Components of education costs in Table 1 become an important part in calculating the budget for education in the educational unit. The cost of education for each educational unit continue the effort to succeed as free education in district/municipality. Prakosa (2010) analyzed the unit costs of primary education in Sragen. Education financing issues was related to the calculation of costs in the education unit. According to Postula (2004), cost is the value and activity or asset, this value is determined by the cost of the resources that are extended to complete the activity or produce the asset. Bastian (2007) stated that the development of cost calculation at the level of primary and secondary schools have not been able to answer the challenges of decentralization and globalization optimally. Furthermore, Granof (2000) states that the system of calculation of costs and accounting systems implemented and developed in the education unit is still much that is based on the form accounting of funds is aimed at compliance against the rules and satisfactory assessment in setting the budget.

2.2 Analysis of Education Costs

The analysis of education costs is done in two ways, namely: cost estimation on the basis of the sources of financing and cost estimation over abasic report from the education unit. Fatah (2008) split the cost analysis into three, namely: a cost-benefit analysis, the study of the determinants of educational costs, and economies of scale study. Related analysis of the cost of education has been done, both through surveys and models. Supriyadi (2010) conducted a study unit costs of education in six provinces in Indonesia with the survey. The analysis was performed based on the location of each school, the costs of education for junior high school located in the city per student per year is Rp 3.147.809. Furthermore, Setyaningrum (2014) analyzed the unit costs at SMK Negeri 3 South Tangerang City using Activity Based Costing models. Based on the model, the cost per student per program per year expertise in the range of Rp 8.923.452-Rp. 10.018.166. In this study, budget estimation are based on RAPBS of senior high schools in Serang.

Calculation of the budget covers the cost of capital and recurrent costs, by analyzing the activity of the unit cost which is then developed in the poll cost and cost object. On the basis of completeness of map units of such analysis, it can be determined the unit cost per student. Value unit cost is the unit cost incurred to provide services to a student per year. Based on this value, standard pattern will be made that can be waged estimate of the cost of affordable education for years to come.

Affordable education costs are all kinds of expenditure incurred for the provision of education. Expenses related to the cost of education, according to the distinguished status among educational institutions of government and private education. As according to its level, it is to distinguish between primary education and secondary education. In this study, it is the cost of affordable education inpublic and private junior high schools in Serang. The budgetcalculation will be estimated for the next five years by the use of two-phase regression.

3. Methods

Shaped empirical research with the survey approach has been done in junior high schools throughout the city of Serang. According Pardoto (2009), empirical research is conducted in which the data are collected through two mechanisms. The first mechanism in the form of a survey, which deals with the understanding and perception of the principal components of the cost of education at the unit level. The second mechanism of data processing in RAPBS by regression analysis.

The study was conducted in public and private junior high schools in Serang City. The respondents in this study is derived from the principal who has had the experience to lead at least 3 (three) years. To calculate the unit cost of education, the equation below was used:

$$B = WT + WNT + AMO + ADM \qquad ....(1.1)$$

$$B = AVTxNT + AVNTxNNT + AMO + ADM \qquad ....(1.2)$$

$$UCP = B / NSTU \qquad ....(1.3)$$

$$UCP = \frac{AVTxNT + AVNTxNNT + AMO + ADM}{NSTU} \qquad ....(1.4)$$

Equation (1.4) yields:

$$UCP = \frac{AVT}{PTR} + \frac{AVNT}{PNTR} + AMOSTU + ADMSTU \qquad ....(2)$$

Description: B = the amount of the budget, WT = teacher salaries, WNT = employee salaries, AMO = material and operational costs, ADM = administrative costs, AVT = average teacher salaries, NT = number of teachers, AVNT = mean The average salary of an employee, NNT = number of employee, UCP = unit cost of education, NSTU = number of students, PTR = ratio of teachers to pupils, PNTR = ratio of employees to students, AMOSTU = total expenditure teaching material, and ADMSTU = average administrative per pupil.

To estimate the number of students and number of teachers over the next five years, a method of exponentially trend is done. Trend exponential equation is a form that is not in a straight line:

$$Y'' = a.b^x \qquad ....(3)$$

Equation (3) can be changed in the form of a straight line equation by doing logarithms on both parts of the equation thus becomes:

$$\log Y'' = \log a + x \log b \qquad ....(4)$$

To estimate the education budget for the next 5 years, present value method is used with the following formula:

$$FV = PV (1 + r) n \qquad .... (5)$$

By: FV = the value of money in all i, PV = the value of money in 2015, r = interest rate (12%), and n = year of estimation.

4. Results and Discussion

To calculate the budget amount and unit cost on public and private junior high schools in Serang City, the equation (1) and (2) have been used. The variables calculated which affect the

cost of education are:the cost ofteacher salaries (WT), the cost of employee salaries (WNT), material and operational costs (AMO) and administrative costs (ADM). Unit cost of education (UCP) were analyzed with regard to the number of students (NSTU).

The results of the analysis of expenditure and budget amounts for junior high schools are shown in Table 1. Based on the data in Table 2 there is an increase in the total budget cost of education (B) from year to year. Among the academic year 2012/2013 to 2014/2015 the amount of the budget increases between 1.76 to 2.18%. In other words, in the amount of the budget for the junior high school level, Serang City Government needs to provide and increase the education budget a maximum of 3% from the previous year.

Table 2: *Total Budget in Junior High School Level in Serang City*

Academic Year	Spending by Codes (Rp)				Total Budget	
	WT	WNT	AMO	ADM	B	
2012/2013	26.052.000.000	6.732.000.000	4.206.150.000	1.925.100.000	Rp	38.915.250.000
2013/2014	26.247.000.000	6.864.000.000	4.381.470.000	2.107.620.000	Rp	39.600.090.000
2014/2015	26.637.000.000	7.128.000.000	4.431.960.000	2.267.280.000	Rp	40.464.240.000

Analysis of unit cost for junior high school is shown in Table 3. Based on this table, the cost of education borne by the Government for junior high school per student per month is in the range of Rp. 213.660 to Rp. 222.121. That is, for a number of junior high school students as many as 15.181 students, Serang City Government needs to prepare a budget for the school year Rp. 40.464.240.000.

Table 3: *Unit Cost of Education in Junior High Schools in Serang City*

Academic Year	Total Budget	Number of Students	Education Cost Unit	Cost Per Student Per Year	Sosiety Contribution Per Month	Government Contribution Per Month	Government Contribution Per Year
	B	NSTU	UCP	BSB	SPP	TPB	TPT
2012/2013	38.915.250.000	15178	2.563.925	213.660	0	213.660,40	2.563.925
2013/2014	39.600.090.000	15196	2.605.955	217.163	0	217.162,90	2.605.955
2014/2015	40.464.240.000	15181	2.665.453	222.121	0	222.121,07	2.665.453

The estimated cost of education is based on secondary data obtained from RAPBS. Meanwhile, not every school principal at the level of education provide optimal access to the required data.For certain reasons,schools are not willing to provide RAPBS data in detail. To

overcome this, the model that will be built based on limited data, as well as other information related to the characteristics of the school, the location, the quality of schools and so on. From some data RAPBS is relatively completed. By using equation (5), the amount of the operational budget of education for junior high schools in Serang City can be estimated for the next five years, the results of the analysis of the estimation is shown in Table 4.

Table 4: *Estimated Education Costs of Junior High Schools in Serang City*

Estimated Costs	Academic Year				
	2015/2016	**2016/2017**	**2017/2018**	**2018/2019**	**2019/2020**
Unit cost	455.556	470.282	485.484	501.177	517.378
Operating Expanses	37.963	39.190	40.457	41.765	43.115

Based on data in Table 4.3, the Government of Serang City in 2016/2017 for junior high schools need to plan operating costs per student per year Rp. 470.282 or the school operational costs per student per month Rp. 39.190. It is the responsibility of Serang City Government to finance all junior high school students in both public and private. For junior high schools, there is no fee charged to students, considering all elements of expenditure, both buildings, equipment, teachers' salaries have been budgeted by the City Government. While, for the private junior high, it is possible there are fees charged to students, given that not all the teachers and the existing facilities at the school are funded by the City.

5. Conclusion

The analysis of RAPBS has shown that several junior high schools in Serang City have operating costs need to be borne by the Serang City Government in the range of Rp. 37.963- Rp. 43.115 per student per month.Based on a review of all RAPBS, every component in every school has a different fee scale. The results of budget estimation for junior high schools in Serang City are in the range of Rp.6.131.250.000- Rp.6.699.240.000; with a unit cost of education per student per year is Rp.455.556-Rp.517.378.

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