

## **An Empirical Analysis of Investment and the Determinant of Unit Cost in Nigerian Higher Education System**

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### **Abstract**

*Higher education in Nigeria is critically constrained with financing resulting in low quality. The key research issue of the present study is to examine financing of higher education in Nigeria paying particular attention to access, quality of graduate output, and internal and external efficiency of the system. The main objective of the paper is to critically examine the adequacy and sources of funding of higher education in Nigeria based on a standard criteria as well as comparing the unit cost of graduate production across the higher education institutions. The study is based on secondary data. A cross sectional sample survey representing 76 faculties selected through a stratified sampling method to represent the three institutional structures of the higher education system in Nigeria was used. In addition to descriptive statistics used a simple linear regression analysis was also implore. The results indicates a low investment to education, also there exist a funding gap in the system. Even for the same type of institution unit cost vary enormously between HEIs. In general the unit cost of higher education in Nigeria is low in comparison to other African countries. In the light of the above findings Nigeria authority require critical revisiting of the current policy of financing higher education*

**Key words:** Investment, revenue source, cost structure, and higher education.

### **1. Introduction**

The increasing number of higher education system worldwide has been witnessed in the last two decades and government financing has been identified as the main source of income for most of the higher education institutions in Nigeria in particular and Africa in general. However, government sources can no longer sustain the increasing demand of higher education system. This in large measure is due to the increase in the demand for the scarce resources from the government by the other social sectors of the country. Furthermore, social and private demand for higher education has increased significantly over the past decade or so and hence, the government alone cannot bear the full cost of education, especially at the higher education level. The government is also faced with a problem of economic deterioration due to the influence of global economic factors and internal problem of terrorism.

Financing higher education the world over has turned out to be a problem and this is as a result of high demand for funds by other social sectors in the country. As observed by various researchers',<sup>1</sup> education and higher education in particular, if viewed in the light that it being a public investment then, societies or a nation allocates resources to make provision for, in return to such social benefit as qualified manpower which contributes positively to national productivity and overall economic development, healthy and conducive political environment. If on the other hand, it is regarded as a private investment where individuals bear the cost of their education to obtain private benefit of higher salary as the most significant feature; then individuals should be made to pay for the cost of their study.

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<sup>1</sup>see for example the work of Becker 1964; Schultz 1981; Psachrapoulos 1996; Chandrasiri 2003; Psachrapoulos and Patrinos 2004; Tilak 2004 and Salerno 2004.

This situation creates disagreement between the two schools of thoughts as to ascertain and strike the appropriate balance between the two and distinguish where the balance between the two is crucial to the extent that its identification helps to draw the line between the amount of public and private resources that should be invested. Higher education has a direct bearing on the economic growth and the development in Nigeria. The public sector largely provided the need of funding for effective functioning of the system providing 90 percent of the funds to the higher education sector. As a result of the inability of the government to provide sufficient financial allocation for higher education institutions, they have not been able to keep pace with development trends in the labor market. The system has suffered a lot due to limited accessibility and facilities, low quality and low meaningful relevance and inadequate resources to face contemporary challenges.

The funding of higher education institutions in Nigeria implies that there is a serious under-funding of the system, both at the public and the private level. The ceaseless demand of the citizenry of the country is to get access to higher education and it also continues to create more pressure to expand the capacity of higher education in Nigeria. With the population of about 170 million people of which more than 60 percent of this population constitutes the youth, the present small number of 128 higher education institutions is considered to be very much inadequate to afford access and equity into higher education institutions in Nigeria. In view of the above challenges therefore, the research is set to examine the adequacy and efficiency of mode of financing higher education institutions in Nigeria in consideration of both the public and the private sector service providers. And also to evaluate cost implications of graduate output focusing on the quality of graduate output.

## **2. Statement of the problem**

Enrolment in higher education has been much higher than the benchmark stipulated by the National Universities Commission (NUC) yearly and by the institutions themselves without the corresponding increase in budgetary allocation by the government. Nigerian higher education has witnessed an average increase in enrolment of 20.2 percent over the past 10 years. However, the funding by the government has increased only at a lower phase of an average of 2.1 percent during the same period. Human capital has been considered to be very important for social and economic growth. Lack of qualified human capital posed a serious problem and challenges to the government, necessitates urgent reforms in the current funding method for Nigerian higher education system. The main research issue here is the lack of allocation of public resources commensurate with high social demand for higher education. At present, the annual demand for higher education is 1,579,176 while the entire higher education sector could only admit 234, 526 per annum and this is about 14 percent of the total number of applications, the rest are deprived of having access to higher education. Even those who enter the universities are provided with minimum teaching-learning facilities resulting in low quality of graduate output.

## **3. Methodology**

The unit cost analysis covers both direct and indirect costs. The direct cost includes the expenditure incurred at faculty level (for example the total salary, emolument and cost of other consumables) while the indirect cost includes the cost of support service provided by administrative and maintenance units, e.g. bursary, works, library and registry departments. In accommodating indirect cost the total sum is apportioned among faculties based on the strength of staff and students. The analysis is based on a survey of 30 HEIs in Nigeria representing Federal, State and Private HEIs. It also covers 76 faculties of different study programs. The analysis was carried out only for one academic year that is 2011/2012. A descriptive statistics techniques were used to summarize the frequency distribution of available cross sectional data to measure the availability and frequency of funds released to higher education institutions in Nigeria. In addition to descriptive statistical applications, a simple linear regression model was used to estimate key determinants of unit costs for undergraduate students. Unit cost has been computed using a given formula in which the total recurrent expenditure of higher education institutions is divided by the total enrolment size in a given year. Based on the definition of unit cost in various higher education institutions in Nigeria and at various degree programs offered by both the Public and the Private higher education institutions the unit cost has been analyzed.

## **4. Empirical evidence**

### **4.1 System of higher education in Nigeria**

It is important to note that knowledge has become the most important factor for economic development in the 21<sup>st</sup> century.

Organization of Economic Cooperation and Development (OECD) (2010) further stated that through its capacity to augment productivity, knowledge has increasingly constituted the foundation of any country's competitive advantage. Hence, education in general and higher education in particular are fundamental to the establishment of innovative knowledge economy and thriving society in any nations. Unfortunately, according to Amaghionyeodiwe and Osinulu (2012) the potentials of higher education systems in developing countries to fulfill this responsibility is frequently frustrated by a plethora of insufficient finance, low efficiency, poor quality and lack of good governance. The general opinion about Nigerian education system is that it has not been performing at the paradigm expected of it. Certainly, the performance of the system is on the decline as postulated by Simbowale, (2003); Samuel, Bassey, Olorunfemi, (2012). Nigerian higher education institutions have grown colossally in size and undergone tremendous transformation since the inception of her independence 54 years ago. However, it is unfortunate to note that their ability to act as engines of growth and development is being challenged by many problems.

Nigeria has been envisaging of acquiring knowledge based economy and social development through the provision of high quality and accessible education to all citizens in cognizance of cultural, religious, regional or political affiliations. Nigeria with its population growth rate of 2.6 percent intends to restructure the educational system to be suitable in providing equitable and quality education for all. Hence, transforming the country in becoming knowledge and learning hub....the engine of growth in Africa. The above will lead to a paradigm shift in educational philosophy which is expected to bring far-reaching changes in the education sector. This can be achieved through the establishment and expansion of higher education systems to accommodate the high secondary school graduate. Educational system in Nigeria is more of public enterprise that has witnessed government complete and dynamic intervention and active participation (Amaghionyeodiwe and Osinubi, 2012). The National Policy on Education (FGN, 2004) states that in Nigeria education is used as a vehicle in achieving national development, and also as an instrument for change. Social and economic development in Nigeria can best be enhanced with the development and expansion of higher education.

There is a strong justification to expand the current capacity of higher education in Nigeria to accommodate the ever increasing enrolment to meet with the social and the economic demands. It is evidently clear that the public sector cannot provide the needed resources required for the expansion and development of higher education towards meeting the target objectives, hence, there is the felt need for seeking alternative means of getting financial resources to higher education (Afolayan, 2015). Higher education leads to improved productivity which in theory should lead to higher income and economic performance as well, significantly contributing to the establishment of the socio-economic development of a nation. Hence, no nation can neglect investment in higher education (Psacharopoulos and Patrinos, 2004). Thus, investment in education will tremendously influence the practice of democracy and the development of a civil society. Although Nigeria's economy growth has increased by six percent in 2013 and seven percent in 2014, yet no appreciative amount of funding has been allocated to higher education. This state of affairs might have been the cause of weak production of quality graduate output which has been identified as a major obstacle to industrial development in the country (World Bank, 2013). The high rate of expansion of the higher education system implies that something urgent must be done to adequately fund the system. The explosion in enrolment number resulting in the influx of students into primary and secondary schools which is a clarion call for immediate government attention in employing other sources of funding for higher education.

#### **4.2 Financing of higher education global view**

Higher education is now perceived as crucial and national assets in addressing many policy priorities, as sources of new knowledge and innovative thinking; as providers of skilled personnel and credible credentials; as contribution to innovation; as attractors of international talent and business investment; as agents of social justice and mobility; as contributors to social and cultural viability and as determinants of health and well-being of the citizenry (Bamiro and Adedeji, 2010). All these support the argument that education in general and higher education in particular remain a "public goods". No matter what, most developed and developing countries have regarded higher education institution as an agent of change, economic growth and development. Consequently, they have placed great premium on the financing of these institutions in order for them to reform creditably the key function of teaching, research and community development in accord with the development of the nation (Ahmed and Adepoju 2013).

Higher education all over the world has the problem of inadequate financial resources to carry out its functions of research, teaching and learning and community service. This has transpired as results of global economic crisis coupled with the increase in the costs of technology and other learning resources that higher education uses to achieve its objectives. The unit cost is rising faster in a developed country because of her GDP growth and the ability and willingness to pay for higher education is higher compared to what is obtainable in the developing countries that experience low GDP growth and low ability to pay for higher education due to poverty level and other macro and micro-economic problems. Unit cost of higher education is generally low in developing countries. Looking at the world context mostly in the developing countries, there is a sharp drop in per capital income which will at the end affect the ability to pay for higher education if the cost is high (Salerno, 2004).

In the United States, for example, higher education institutions were able to generate at least up to 40/45 percent of their annual budget from fees, external donations and research (Li-Chuan, 2004; World Bank 2010; Delaney 2011). Australian higher education also generates up to 30/35 percent of their revenue from fees, research and donations, for example higher education in Australia, fees are charged up to 3,300 USD for social sciences 4,700 USD for the sciences and business and 5,500 USD for medicine (Ehrenberg 2000). In New Zealand, higher education institutions generate up to 20% of their revenue from fees, research and donation and the higher education institutions charge tuition fees ranging from 2,300 to 5,500 USD depending on the type and the course of study. Netherland charges fees between 2,250 and 3,150 USD and they generate more than 20 percent of what they need from fees and research.

There are various ways in which higher education institutions are funded world over. One country for example can have one or more models of funding its higher education depending on many factors that include economic and political goodwill. World Bank (2010) identifies some predominant models that are used in the world: The first model according to World Bank (2010) has to do with financing higher education through taxes collected from the public and provide degree programs free to student without charging tuition fees. This is a practice in some African countries like Mali, Tanzania, Egypt and some other countries in Asia like India and the Maldives and Sri Lanka. The second model is the cost-sharing model in which the student is asked to pay for the education he received. The cost of producing a graduate is shared between government and the individual student or his parent. This model is gaining popularity because of the global economic crises and most countries want to shift the burden of funding higher education to the parent and the organization that hired or employed the graduate. USA leads in adopting this model the UK and New Zealand and some African countries like South Africa and Botswana have adopted this model.

The third is called a dual track system where some universities are allowed to charge tuition fees while fees charged are for another set of students who have the minimum qualifications for entry, but have failed to receive sufficient marks to gain a free place. This is mostly allowed in order to solve the problem of access and inequality in higher education. This model is commonly practiced in the former communist countries like China, Hungary and Russia. The fourth model is called a mixed mode and this model is set to combine the first and the second model. This is a situation where some higher education institutions are absolved from charging tuitions fees while others are allowed to charge fees from students. This model is market-oriented. Nigeria and Mexico adopt this model. The fifth model is a voucher system where a student will be provided with a voucher or scholarship which can be used in private higher education institutions and as such are an instrument of student aid. USA, Chile, Poland and Sweden use this model. The six models typify the introduction of differed tuitions fees, where students meet the cost of their undergraduate education after they have completed their studies and commence work. Countries like Australia and England have this model. The seventh model is the introduction of “up front” tuition fees at all public universities. Vietnam, Austria and Netherland have this model.

To sustain growth and development in Africa, there is the felt need for state to diversify their economies and thus train enough human capital which will carry out the support and transformations needed for the continent to remain strong and have a sustainable economy based development (Banya and Elu, 2001; Oketch, 2003; Akinyemi, 2013). Higher education in this case plays a significant role in training and development of the individual who is qualified and capable of implementing new strategies and technological innovations that lead to achieving the desired goal (Daniel and Ingo, 2007). Africa is a big continent with enormous challenges and prospects. For Africa to achieve and reap the benefits of the investment made in higher education, qualified human capital, enough finances are needed, (Moses, 2003; World Bank, 2010).

Public investment into higher education in Africa is very low compared to other continents of the world, hence, there is a need for the states to wake up and salvage the situation (World Bank, 2010). This sequence of events is perturbing in the sense that there are some countries in Africa that allocate as low as 0.32 percent of their total government expenditure to higher education whereas the number of student enrolments has doubled yearly (Pillay, 2004).

## **5. Theoretical foundation**

What follows is an explanation of the essential tenets of the theories on financing of higher education. The Principal-Agency theory; The Theory of the Firm and Human Capital Theory

### **5.1 The principal-agency theory**

This Theory was developed in 1976 by Jensen and Mackling to help understanding of the bond between the Principal and the Agent under the representation of a contract. Principal Agency Theory addresses the relationship in which a contract with one or more individual call the Principals engages another individual call the Agent to perform some service on their behalf which involves delegating some authority for decision making to the agent. The agency theory is relevant to this research to explain how the government (Principal) provides funds to the higher education (Agent). Considering the fact that more than 90 percent of the funds allocated to higher education in Nigeria are administered on behalf of their proprietors, therefore, government or the proprietors should monitor the funds given to the institutions. The agency theory explains if the funds provided by the government (principal) to the higher education (Agents) are adequate, using set criteria. Principal-Agent theory has been used by many researchers<sup>2</sup> as a framework to explain higher education financing in the world and Nigeria in particular. For example Daniel and Ingo (2007) uses agency theory to explain the funding reforms in higher education and the university-industry links in a developing country.

They state that the relationship between a government and a university can be viewed as the relation between a principal and his agent: the principal assigns the duties of carrying out research and teaching to universities, and supply the necessary funding. The agent in turn, uses this public money for basic and applied research as well as teaching. Thus, agency theories offer a framework for clarifying and predicting the effect of changes in government funding on the performance of higher education institutions. Lane and Kivisto (2008) argue that there are three reasons for the suitability of agency theory to the government–universities in Nigeria. First, in Nigeria generally funds to universities are provided by the government using resources obtained from the tax payer. Secondly, universities produce products that can be considered as public goods for the social good of which the outcomes are difficult to measure; therefore, agency theory is required to ensure that the performance of the agent is continually measured to align with government objectives. Thirdly, universities in Nigeria has multiple principal hence, the universities operate under open and hidden contracts with many funding bodies and government agencies; therefore, a comprehensive framework like agency theory is required in order to monitor and understand the dynamics of multiple principal–single agent relationship.

### **5.2 Theory of the firm**

According to Braendle (2004) Ronald Coase is said to be the founder of the theory of the firm in 1937, and his belief was that firm must be consistent with constant returns to scale rather than relying on increasing return to scale. Theory of the firm has some basic assumptions that need to be clearly understood in order to make theory useful for explaining the issue of cost and financing of higher education in Nigeria. The basic assumption according to Babalola (1998) is that each university; behaves rationally but not in the content of profit maximization since a higher education is not for profit in Nigeria. Always it produces each output (graduates, research, administrative and community service) as cheaply as possible given the nationally recommended production conditions. They produces only one product (students). It is free to hire as many units of any factor of production as possible since all units of each factor are assumed to be the same in terms of efficient and in infinitely elastic supply at their current price. Universities are said to be at equilibrium position when total revenue equals total expenditure. The theory is relevant in this research to estimate the unit cost of graduate production in higher education in Nigerian using average cost concepts to explain the likely relationship between unit cost per student and five other independents variables.

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<sup>2</sup> See the work of Schiller & Liefner 2007, Ahmad, Farly and Naidoo 2012, Blalark 2012, Kivisto 2005.

One of the main arguments of the theory is that increases in output will result to decrease in unit cost and average total costs are likely to fall as output increases due to scale economies. A number of researchers uses the theory of the firm as a framework to explain higher education financing, for instance Babalola (1998) uses theory of the firm to explain the concept of equilibrium of the firm. He found and offered explanation on how to move recurrent resources from areas where there is overspending to where there is underfunding with respect to the costing parameter recommended for Nigerian universities by the National Universities Commission (NUC). Chandrasiri (2003) argued that theory of the firm provides a face for understanding of the university financing. He further states that in the theory of the firm the average total costs are likely to fall as output increases due to the influence of economies of scale. He explained further that in the case of university education cost per student will fall as enrolment increases, this is because some of the services in the universities can be utilized more efficiently with large student numbers and if that is the case, universities will naturally try to enroll more students in order to minimize cost.

### 5.3 Human capital theory

Human Capital Theory has its roots from the work of Adam Smith “Wealth of Nation” Smith (1776) talks extensively on how skill and knowledge acquired by the labor force can influence economic growth and development. He explains that resources spent on education and training of human capital is as important as the resources spent in acquiring physical capital and investment. Theodore W Schultz advances from there and works extensively on human capital theory. A number of researchers use the human capital theory as a framework in their research work and they refer to Psacharopoulos and Patrinos (2004) who observed that the earnings of university graduate increase significantly with the additional qualification earned compared to someone’s earnings who did not have a degree certificate and or experience.

Also Atua here (2008) in his research it describes the challenges of funding higher education in Ghana and provided the usefulness of human capital in explaining the controversial phenomena in financing higher education and its importance as a cost sharing mechanism. Kjelland (2008) stated that the human capital theory argues instinctively that education in general and higher education in particular endows an individual with productivity-enhancing human capital and that this increased productivity results in increased earnings in the labor market. Since that is the case, then there is a need for that individual to contribute also towards financing the higher education system that produced him. He uses the human capital theory to explain the economic returns to higher education.

## 6. Results and discussions

The findings of the research further reveal that the total investment of 2.9 percent of the GDP, 8.4 percent of the total government expenditure to education and 1.3 percent to higher education is considered very low when compared to an average of five percent as obtainable in other African countries and four percent in some Asian countries. This allocation is also below the UNESCO recommendation of 26 percent of government expenditure for education. The average private rate of return to higher education of 27.8<sup>3</sup> percent in African is high. This pattern cuts across the private and the public sector. Hence, based on the theoretical postulation of Human Capital Theory an additional year of schooling results in an increase in life earnings of an individual’s, therefore, it is expected that the individual should contribute toward financing the sector. The externalities associated with the additional year of schooling is not enough to allow for the public subsidies on higher education, hence, the call for private contribution toward financing the sector.

The high private return gives a rationale for reducing public spending and allows charging fees for higher education. Such charges are justifiable because the evidence indicates that people are willing to pay for higher education. In the African context for example, private rate of return to higher education are so high that even after students are asked to pay fees for higher education it will remain an attractive personal investment. The unit costs based on enrolment reveals that, Private HEIs has the highest unit cost of 2,075 USD, followed by Federal Higher Education Institutions (1,970 USD), and State HEIs (1,369 USD). However unit cost estimates based on graduate output indicate that Federal HEIs record the highest unit cost of 10,024 USD, followed by Private HEIs (8,709 USD) and State HEIs (6,676 USD).

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<sup>3</sup> See Psacharopoulos 1994 table A1 pp. 1340f

The variation is due to high faculty members in the federal HEIs as compared to private and state HEIs. It is also due to low student enrolment in the private HEIs as compared with federal and state HEIs. Federal HEIs are the most expensive institutions in Nigeria in terms of cost per graduate output; this may be mainly due to over staffing. The State HEIs are poorly resource and have therefore dysfunctional low unit cost. On relative terms, the unit cost of graduate output in Nigeria has been low relative to South Africa (11, 453 USD), Botswana (10, 456 USD). These countries also incur lower unit cost than those in OECD countries e.g. Iceland (11,900 USD), United Kingdom (15,000 USD), Netherlands (18,000 USD), and Norway (19,000 USD). The unit cost variation by discipline indicate that Medicine as the most expensive study program with a unit cost of (21,109 USD), followed by Agriculture with a unit cost of (13,970 USD), then Pharmacy with a unit cost of (13,527 USD).

In Federal HEIs, Medicine has the highest unit cost (21,109 USD), then followed by Pharmacy (13,527 USD) then Engineering (10,340 USD) program. State HEIs shows that Agriculture has the highest unit cost (11,254 USD) followed by Medicine (10,261) and then Engineering (8,231 USD). In the Private HEIs Medicine has the highest unit cost (14,824 USD) followed by Agriculture (12,164 USD), then Engineering (9,406 USD). This pattern shows that in both public and private higher education institutions laboratory based courses are more expensive than the library based courses. The latter includes programs on Administration, Education, Law and Social Sciences recorded low unit cost across the institutions. The representative equation to be estimated has a linear relationship between the dependent and independent variables and the model is as follows:

$$UCPUG = \alpha_0 + \alpha_1 ENSZ + \alpha_2 TSR + \alpha_3 NAASR + \alpha_4 ADCP + \alpha_5 RCP + \alpha_6 DSD + U$$

$$UCPP = x_0 + x_1 ENSZ + x_2 TSR + x_3 NAASR + x_4 ADCP + x_5 RCP + x_6 DSD + U$$

Where:

UCUG	=	Unit cost per undergraduate
UCPP	=	Unit cost per program
TSR	=	Teacher/Student Ratio
NASR	=	Non-Academic/Academic Staff Ratio
ENSZ	=	Enrolment Size
RCP	=	Research Cost per Student
ADC	=	Administrative Cost per Students
DSD	=	Curriculum Based Courses (1 for Laboratory and 2 for library)
U	=	Stochastic Random Term, Error Term

### **Model estimation**

The models stated above are estimated using Ordinary Least Square (OLS) estimator, the choice of this estimation technique is borne out of the BLUE properties that the OLS possess, that is, it is Best, Linear, Unbiased Estimate. Based on this, the models are estimated and regressed with the help of SPSS statistical package version 20 and the results are as follows;

$$UCPUG = 271809 + 0.19 NASR + 0.44 ADC + 0.19 RCP - 0.13 ENSZ - 0.57 TSR - 0.16 DSD.$$

$$UCPP = 647909 + 0.17 NASR + 0.10 ADC + 0.23 RCP - 0.29 ENSZ - 0.28 TSR - 0.41 DSD$$

The key determinants of the unit cost was analyzed using five major variables e.g. non-academic/academic staff ratio, administrative cost, researcher cost, enrolment size, teacher/student ratio, and discipline specific dummy. Among them, non-academic/academic staff ration, administrative cost and research cost have a positive impact on the unit costs. Enrolment size, teacher student ratio, and discipline specific dummy variables have a negative coefficient implying that an increase in these variables would lead to corresponding decrease in the unit costs. The results conform the theoretical argument of scale economies due to the use of indivisible factor services in higher education. It also captures the quality related aspects of higher education.

In fact, the quality of graduate output in Nigeria is low due to high teacher student ratio in both the public and the private HEIs. Teaching staff in Nigerian higher education institutions are grossly inadequate as most of the newly established Private, State and Federal institutions rely heavily on part time and visiting lecturers from the older institutions. They are also not well qualified and most of the institutions employ junior lecturers at low salary levels. Thus the cost of higher education tends to be low. The analysis reveals that average cost continue to decline with any additional number of students admitted. This scenario continues until when total enrolment exceed 3000 students for public HEIs and 300 students for private HEIs.

At this point the marginal cost of additional student would be less than the average cost per student and as a result an increase in the size of the student total enrolment will reduce the cost per student. The traditional practice as postulated by the tenets of the Theory of the Firm, in all firms, average total cost decline as output increases, this is largely due to changes in technology, labor, managerial economies and marketing. But as it were HEIs are not for profit; hence, some of the assumptions may not be applicable to HEIs. However, HEIs certainly enjoy some aspect of the assumption for instance; cost per student will significantly fall with increases in enrolment. This is as a result of joint cost enjoying by HEIs which were spread over the number of output produced. The reason being the indivisible nature of some human resource like the person of the dean, head of department and even the Vice Chancellor himself cannot be apportioned in-to half to provide service for a given number of students and left out the other half. So also physical facilities like the classrooms, the lecture rooms and the library, HEIs can make optimal use of them as well as they did not exceed their carrying capacity.

In a short-run, the average cost will fall as output increases. This is as a result of effective use of the invisible factors as identified earlier. But in the long-run there is going to be a limit in which case the average cost will fall. This is when the optimum output exceeds 3000 in public HEIs and 300 in private HEIs, the cost will rise. This is because the indivisible factors are now being used to the fullest. In the present study however, the model identified five independent variables out of which 'enrolment size' (ENZS) depicts an inverse relationship with the unit cost. This will make the HEIs to produce as cheaply as possible and with the increase in enrolment the unit cost will fall, if that is the policy of the government. Teacher student ratio (TSR), the person of a teacher cannot be divided into half to provide the required service, hence, teachers are indivisible factors of production. They can be efficiently utilized with large student number, but work less with efficient small number of students. The number of teachers will increase if the TSR is peg and HEIs exceed, thereby increasing the salary bill. Hence, and increasing the unit cost per student and viz a viz.

## 7. Conclusion

In conclusion therefore, low investment in education as recorded in the past two decade casts doubts on sustainability of the continued financing of the education and especially higher education in Nigeria. It is also worthy to note that the analysis presented in the present study points to the need for improving quality of graduate output by providing high quality resource inputs. Considering high rate of return on higher education, the government should consider the private sector participation as possible sources of finance to higher education in Nigeria. Based on the findings of the study, it is expected that the government should increase its funding capacities to higher education. The higher education should research on various means of generating additional resources to augment what is disbursed by the treasury. Both the government and individual stakeholder who owns higher education institutions should provide enough learning facilities and resources for teaching and learning to improve quality and national productivity. The current funding formula should be changed to reflect on performance based funding formula. The government should consider charging tuition fees at the postgraduate level and allow the private sector enter the system as higher education providers in the country.

**Table 1: Determinants of unit costs**

Unit Cost	CNST	NASR	ADC	RCP	ENSZ	TSR	DSD	R <sup>2</sup>
UCPUG	271809 (2.49)	0.19 (0.14)	0.44 (0.34)	0.19 (0.14)	-0.13 (-0.95)	-0.57 (-0.40)	-0.16 (-0.11)	0.50
UCPP	647909 (7.52)	0.17 (0.12)	0.10 (0.08)	0.23 (0.23)	-0.29 (-0.21)	-0.28 (-0.28)	-0.41 (-0.41)	0.49

**Source:** Regression results obtain from SPSS data analysis by the author

\*Figures in bracket are t-values and all coefficient are significant at 5% level with the except NASR and ADC



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