Journal of Engineering and Applied Sciences 12 (6): 1440-1447, 2017
ISSN: 1816-949X

Higher Education Funding Mechanisms: Characteristics and Impacts of Formula Funding Mechanism

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Abstract: The use of formula in allocating funds to meet the financial needs of Higher Education Institutions (HEIs) has been in use by many countries, especially in Europe and by the United States of America since the late 1960's. The successes recorded in its use, especially the decentralization of financial management of public HEIs, has made it attractive for other nations (developing and the less developed) to embrace the practice. This study reviews the related literatures on the concept of higher education funding models in general and funding formula as a mechanism for funding higher education in particular. The primary aim here is to review the scope and the potentials of deploying formula funding as an allocation mechanism for funding public HEIs and how the various stakeholders of tertiary education can identify how best to distribute public resources effectively and efficiently. Thus, the study discusses the various types of funding formulas in use today and their efficiency in addressing the financial needs of the HEIs. Higher education funding formulas are mathematical expressions containing same variables (e.g., student numbers, enrollments, etc.) that are used to determine an institutions budget. The study is expected to provide an insight into the characteristics and the impact of formula funding mechanism and provides some guides on how to select a funding mechanism that will be efficient, equitable and transparent.

Key words: Decentralization, funding models, formula funding, funding mechanism, public resources

INTRODUCTION

Higher education has always been accorded a priority status by many governments. Besides being a repository of knowledge, Higher Education Institutions (HEIs) have been considered by many nations as the "engine room" of their national economic growth (Johnstone *et al*., 1998). This recognition is irrespective of whether the institutions are publicly or privately owned and funded.

Higher education funding is amongst, if not the largest, discretionary spending item on the budgets of many national governments (Layzell and Lyddon, 1990). This has therefore made funding allocations for higher education institutions to be influenced by a number of factors, typical amongst which are government's fiscal capacity, National political environment and HEI leadership capacities. Due to increasing financial difficulties faced by the HEIs all over the world, coupled with the need to decentralize the financial management of public HEIs, McKeown-Moak (1999) contends that attention has now shifted to the use of formula funding mechanism to fund public higher education. Under this system, a lump sum figure is allocated to an HEI who will in turn redistribute same amongst its contending financial needs. It can therefore be said that higher education formula funding mechanism is a combination of some defined criteria, used by governments in the allocation of public resources. According to Levacic (2008), a funding formula is objective, transparent, ensures equity and promotes efficiency.

Although, there are variations in Higher education budgeting between nations, their basic structures are however the same. Most countries use coordinating agencies to supervise and coordinate the operations of their HEIs, like the National Universities Commission (NUC) in Nigeria which uses some formulas tagged the "National Universities Resource Allocation Parameters" as a basis for budget recommendations to government. As reported by McKeown-Moak (1999), the increasing competition for government funds due to increase in enrollments have prompted legislators and other HEI stakeholders, to look for the most convenient ways of funding HEIs. It is therefore left for the leadership of the HEIs, to come up with appropriate strategies to be used on political leaders to facilitate favorable higher education budgeting consistent with the government's political culture and fiscal capacity (Orr *et al*., 2007).

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Literature review

Higher education budgeting: A budget is an estimate of revenues, expenses and resources over a specified future period of time and can be made by a person, a family, a group of people, businesses, states or national governments. As a plan for a specified period of time (Massy, 1996), a budget is generally used as an administrative tool to:

- Plan how to achieve some particular objectives
- As a standard for measuring performance
- As a device to plan for the future

Budgeting, according to Wildavsky (1986) is therefore a process through which available resources are shared among different competing units in an organization. It has also been described as the process of translating financial resources into human purposes. While resources are limited, human desires are limitless, thus there is the need to find ways of apportioning available funds among the various competing needs which is the major task of budgeting. It is therefore a mechanism for allocating scarce resources among competing needs and it attempts to link proposed expenditures with desirable future events. In the context of higher education, budgeting is described by Jones (1984) as a process of parceling out available government resources to the HEIs for the purpose of achieving the government's educational objectives. It can therefore be described as a devise used by governments to carry out their plans and also by which it signals its priorities. Since, resources are limited there is the need to identify effective allocation techniques/mechanisms that will distribute these resources judiciously across all units in an organization.

Budgeting techniques: The way funds or revenues are allocated in an organization determines the type of budgeting technique being used. In the HEI allocations, the following are the most common budgeting techniques:

- Line item/traditional budgeting
- Incremental budgeting
- Zero-base budgeting
- Performance based budgeting

Although, the above approaches are considered distinct in terms of their preparation processes (Burke, 2002), opined that many governments use a variety of hybrid versions to address their specific needs.

Line item budgeting: Usually called traditional budgeting this is a budgeting technique which lists items on the financial statement according to their reporting units, groups or cost centers and each expenditure item is accounted for separately. The process uses historical figures as a base for estimating expenses for the next financial period, thus allowing for quick expenditure justifications to be made. Unusual requests or allocations can easily be detected by the management who will seek for proper explanation for such an anomaly.

Although, this technique is traditional in nature and is simple to operate, its major disadvantage however, lies in its lack of proper analysis by promoting the maintenance of the status quo. What worked last year will be maintained with little or no adjustments. This leads to unnecessary fiscal year end spending sprees by management with a view to exhausting all unspent amounts.

Incremental budgeting: This is also a traditional budgeting technique whereby the budget is prepared using the immediate past budget as a base with increments upon that base to get a new budget. Such increments are usually adjustments for inflation or for some planned increases or decreases in operations.

The major advantage of this budgeting technique is that it is also very easy to prepare, like the line-item budgeting and it is also easy to understand and all changes in the budget can be quickly traced. However, incremental budgeting assumes that all current activities and costs are still needed without further examining them in detail, thus it focuses on past activities rather than looking forwards. Performance targets are often unchallenging in this type of budgeting, since they are based on past performances with some kind of little adjustments. It also allows past inefficiencies to be carried forward into future periods as existing structures are usually allowed to remain.

Zero-based budgeting: This technique arose out of the need to improve the line item and the incremental budgeting techniques. Here resource allocations are determined through a zero-sum accounting method with no reference to past budgets or past performances. Here all expenditures are scrutinized comprehensively before final approval is given. This technique therefore allocates resources optimally as expenditures/activities has to be justified and approved before any allocation is made.

The major advantage of this technique is that it eliminates all outdated and unnecessary expenditures/ activities by concentrating funds to those areas that are

more resourceful to the HEIs. Thus, it curbs wasteful spending by removing all inefficient and obsolete activities. Its major disadvantage however is the fact that the technique is expensive and time consuming. It needs a lot of time, planning and paperwork, before coming up with an effective system. The comprehensive review of expenditures that is being propagated by this technique can only happen periodically due to time and cost, thus almost defeating its essence as justifying every expenditure may not be feasible or practicable after all.

Performance-based budgeting: This is a budgeting exercise where HEIs are expected to "cost out" their activities with a view to achieving the efficiency of their numerous processes (Segal and Summers, 2002). Performance-based budgeting therefore enables tertiary institutions to compare their performances against their expenditures for a particular period. In this process, all expenditures are based on a standard cost of inputs which is then multiplied by a certain number of units of activities that are expected to be provided in the period under consideration. This type of budgeting requires the identification of Key Performance Indicators (KPIs) and linking them to key resources that are vital to the effectiveness of the institutions. Performance-based budgets are therefore translations of institution's mission, goals and objectives in monetary terms. It is a resource allocation process aimed at achieving some specific program's goals and objectives; thus rightly called budgeting for results (Young, 2003). Performance-based budgeting requires the following factors to be effective:

- Results (final outcome)
- Strategy (ways of achieving the results)
- Activity/output (what was done to achieve the results)

The above goes to show that in performance-based budgeting there is a relationship between the rationale for a specific activity and the end-results obtained therefrom. Thus management can easily identify those programs or activities that are cost-effective in achieving the institution's overall objectives.

Performance-based budgeting technique is considered to be better because it provides a better platform, especially in government organizations, for effective legislative reviews and evaluations. It eases legislative budget revisions because all activities budgeted are expected to have been so budgeted in line with standard and acceptable cost inputs. However, its major limitation lies in the lack of standard cost information, especially in government organizations. There is also the problem of evaluation as Young (2003), posits that the approach can neither evaluate the appropriateness of a program/activity in relation to the goals of the organization, nor can it determine the quality of outputs/services produced. But generally this technique has a lot of enhancements to offer when applied appropriately.

MATERIALS AND METHODS

Higher education funding models: Cullingford and Blewitt (2013) rightly identified higher education as a key factor in the process of sustainable development in the 21st century due to its growing demand. They contend that a country's national development is being measured by the quality of its higher education system. Higher education administrators no longer sits in the comforts of their seminar rooms and campuses to observe, criticize and evaluate national issues as the sector is now a global player in the production of knowledge. Governments therefore, provides support to education in general and higher education in particular because of its anticipated positive contributions. Besides providing a platform for the upliftment of the students, it also improves the socioeconomic wellbeing of the nation (Aladekomo, 2004). It is no wonder therefore that in almost all economies, the government is the major primary source of funds for higher education (Schiller and Liefner, 2007).

The mechanism for distributing funds to public universities is closely linked to general policy choices relating to the HEIs. To a large extent the distribution method determines how this universities achieve the higher education objectives of quality, efficiency and equity (Jongbloed, 2004). It is one thing for a nation to budget and allocate funds to the educational sector annually, it is yet another thing to distribute these funds effectively to the beneficiaries. Different governments deploy various methods of allocating funds to their HEIs depending on their financial capability and educational policy objectives (Layzell, 2007). Thus, the various funding methods have been designed, in most cases, to achieve different objectives. McKeown-Moak (1999) believes that while some methods are designed to provide adequate funding for the HEIs, others are on the other hand, designed to distribute these funds equitably across the institutions with a view to providing stability. Thus, for a proper classification of the various funding formulas in use in our HEIs we need to identify what aspect of HEIs operation is the government funding and how is it being funded (Jongbloed, 2008). There is also the need to know the guiding principle in the funds allocation. Are the funds allocated based on inputs only or does it extend to educational performances (outputs) of the HEIs? While input funding refers to allocations made to cover distinct

costs, like salaries and wages, maintenance costs, etc., output funding on the other hand, refers to allocations made to an institution specifically tied to teaching and research activities. The funding problems of HEIs is not just about the volume of funds as noted by Sorlin (2007) but it is more about the methods and mechanisms used in its allocation (Jongbloed and de Boer, 2012).

Funding of HEIs is usually done through various funding formulas or models which will be mostly stated in various national policies on education. Layzell (2007), identified five popular mechanisms which are generally used internationally in allocating and distributing public funds to HEIs. These are formula funding, incremental budgeting performance contracting, vouchers and performance funding. These formulas ranges from simple arithmetic arrangements to complex statistical computations. Now a days, funding formulas are being used by governments to not only allocate resources to the HEIs but also as control tools in the higher education environment. The five models are as presented.

Formula model: According to Layzell and Lyddon (1990), this model is the most traditional model of funding Public Higher Education. Here, the national assembly or the legislature will determine first, from the national budget, how much should be allocated to the HEIs and then this general amount will be distributed to the receiving institutions through a funding formula. A higher education funding formula is therefore a descriptive statement that prescribes in a numerical form, how the allocated funds from the national treasury will be appropriated amongst the many contending HEIs adequately and equitably to cover their programs and all budgeted functions. It provides objectivity in arriving at the amount of funds needed by the institutions, based on the availability of funds and the extent of their activities. The formula is usually being administered on behalf of the government, by coordinating agencies (like the National Universities Commission in Nigeria) which usually serves as a buffer organization between the government and the HEIs. Layzell (2007) therefore posits that funding formulas are mathematical algorithms used to allocate some or all of the funding for public colleges, universities and other higher education programs, using some set of factors (rates, ratios and percentages) in relation to some specified inputs (enrollments, credit hours, researches, etc).

The major advantage of this model of funding is that it is simple to apply and it reduces the need for lobbying for funds by HEI administrators and their political collaborators (Ahumada, 1990) as it provides a partial funding assurance to the HEIs from all upcoming budget appropriations. It will therefore allow for proper institutional planning and fiscal autonomy of the receiving institutions (McKeown-Moak, 1999). Its major drawback, however, lies in its tendency to rely and reproduce past costs and behavior patterns of the recipients, irrespective of changes in their needs and priorities (Ahumada, 1990; McKeown-Moak, 1999).

Incremental budgeting model: This is a very common approach of preparing budget estimates, especially in developing countries (Layzell, 2007). In this model, previous year's actual expenditure is used as a base for current year's budget. An amount will then be added (incremental) or subtracted (decrease) to the base, according to established budget guidelines. The model, according to Layzell (2007) and McKeown-Moak (1999) is the most basic and common approach to HEIs funding in many countries (USA inclusive), though it comes in different variations. Under this model, policy makers usually focus on new programs presented in this year's budget that are not on the previous year's budget and also those items in the budget that are likely to be affected by inflation and make adjustments accordingly.

The model is very easy to implement as it doesn't require too much complicated calculations (Ahumada, 1990; Layzell, 2007; McKeown-Moak, 1999). It also has the advantage of producing stable budgets over time and budget adjustments can be projected based on current inflationary trends. However, the major disadvantages associated with this model, according to Layzell (2007) are that it has the potential to perpetuate longstanding funding inequities between HEIs, thus the possibility of creating discords between them. The model has also been criticized as been historic, rather than future-oriented and it doesn't take into account institutional missions and objectives in its fund allocation efforts. Its major flaw however is on the assumption that the previous year's funding is right whereas it may be too low or too high in sustaining HEIs activities in the previous year (Layzell, 2007).

Performance contracting model: Performance contracts are non-binding regulatory agreements negotiated between government and HEIs which define some set of obligations for HEIs, the achievement of which will qualify them for funding (Salmi, 2013). Under this model, the government will agree to provide a certain level of funding to the HEIs in exchange for a specified service or a specified level of performance (Layzell, 2007). The government can enter into a contract with the institutions and will agree to provide a particular sum of money, if the institution, for example, enrolls a particular number of

students and retains them for a specified period. This model is usually found in the United States of America (USA) and is commonly practiced by the state of Florida (Breneman, 2005). In France, since 1989, more than one third of the countrie's public HEI recurrent budget has been set aside for 4 years performance contracts (Salmi, 2013). The government enters into this kind of contract with the HEIs with a view to enrolling students into specified programs like medicine, veterinary medicine, agriculture et cetera (Layzell, 2007). In Finland, beside setting general goals for all the HEIs there are specific goals also attached to individual institutions that qualifies them for public funding (Salmi, 2013).

Vouchers: In this model, the allocations of the HEIs will not be given to them directly. Instead, each student admitted by the HEIs would receive a voucher or stipend to use for the payment of his/her school fees (Layzell, 2007). It is a certificate of funding issued by the Government to beneficiaries (students) in which the beneficiary or his parents have control of and are able to pay for their tuition and other fees chargeable by the school. The vouchers, according to Orr *et al*. (2007) are state funded scholarships that pay for students to attend schools of their choice, especially private schools with public funds. The most prominent example of this model is found in the former Soviet Republics of Kazakhstan, Georgia and Azerbaijan and it is also very popular in the state of Colorado, USA (Salmi, 2013).

The underlying philosophy behind the voucher model as postulated by Layzell (2007) is that it can improve educational quality and efficiency through institutional competitions for students. Public universities will try as much as possible to design good and attractive programs to entice students to them which will mean more vouchers, thus more funding. While some countries are restricting the use of vouchers to public institution (e.g., Australia), others (e.g., USA) have allowed its use to extend to the private schools and colleges.

Performance funding formula: The current fiscal realities are forcing governments to carefully consider how they allocate their limited resources between the various contending sectors of their economy. Thus allocations to higher education has been subjected to various levels of checks and counter checks, just to ensure probity and accountability (Salmi and Hauptman, 2006). Initially, governments commonly allocate funds to HEIs based on enrollment to reinforce their commitment to accessibility and to also ensure equity (Miao, 2012). Consideration then is given only to the input side of the HEIs which is now under serious review in most developed and developing countries who consider enrollment as a poor predictor of overall institutional performance (Salmi and Hauptman, 2006). Therefore to ensure that the government's investment in education which is been sponsored by the tax paying public is yielding the best returns, attention has now shifted from input funding to funding for outcomes as well (Jongbloed and de Boer, 2012; Miao, 2012; Salmi, 2013).

Performance Based Funding (PBF) is a system of allocating funds to HEIs based on some specific performance measures like course completion, credit attainment and graduation, instead of funding based on students enrollment only (Layzell, 2007; Miao, 2012). The system came into being, especially in the United States of America, out of government's need for assurance that taxpayers funds, used in funding public universities and colleges are not only being invested and used properly but are producing desired outcomes at the government's acceptable level and rates (Powell *et al*., 2012; Tandberg, 2010). The model attaches some or all of a governments funding to the HEIs on some specific indicators, directly or indirectly in a formulaic manner, the attainment of which will qualify the institution to receive a designated amount for such a performance (Acfalle and Hampton, 2013; Burke *et al*., 2002; Layzell, 2007; Polatajko, 2011). Although, this method looks similar to the formula model presented earlier as noted by Polatajko (2011), the major difference however is that performance based funding tends to reward HEIs for achieving some set of metrics that are strategic to the government that are focused on accountability and institutional improvements (Dougherty *et al*., 2014; Layzell, 2007). The underlying philosophy in performance based funding therefore is to create a competitive environment among public institutions with a view to motivating them to become more efficient and effective (Polatajko, 2011; Shin, 2010). The model is designed to incorporate both enrollment (input) and performance metrics (outputs) as incentives for the HEIs to continue making the desired progress. As noted by Salmi and Hauptman (2006), performance based funding method differs markedly from other methods in the following ways:

- The approach rewards institutions on actual, rather than perceived or promised performance
- The approach use performance indicators to reflect public policy objectives, rather than the needs of the HEIs
- Incentives are for institutional improvements and not just for maintaining the status quo

The system, if designed well, can improve targeted outputs and also reflect good and appropriate stewardship (Bogue and Johnson, 2010; Kallison and

Cohen, 2010). Measures of performance should be clearly understandable and measurable according to Cavanaugh and Garland (2012) and should also be transparent and very visible such that they focus on targets.

Characteristics of higher education formula funding model: Although, there are as many HEI funding formulas as there are national governments they however share some basic commonalities. Formula funding mechanisms were designed to accommodate the visions and missions of the higher education institutions, irrespective of their peculiarities. In almost all nations where funding formulas are in use, some visible common characteristics can be identified (Kariwo, 2010; Noe, 1986).

Complexity: Fomula funding is an intricate composition of nearly every major facet of university activities. These includes but are not limited to, instructions, library, student affairs, repairs and maintenance, institutional support services, etc., thus formulas used in HEIs generally have many different parts that touches on almost all the operational activities of a higher institutions.

The use of base factors: Most HEI budgeting formulas, especially in America and Europe, deploys the use of some base factors like enrollment, credit hours acreage or square feet of building spaces. This is to allow for greater precision and accuracy in allocating scarce public funds. The base factors are then deployed in the formulas as basis for computing annual allocations, using rates, percentages or ratios.

Zero-based budgeting: All igher education funding formulas are zero-based (Noe, 1986). Here resource allocations are determined through a zero-sum accounting method with no reference to past budgets or past performances. All expenditures are scrutinized comprehensively before final approval is given thereby enhancing institutional cost effectiveness. Resources are therefore allocated optimally as all expenditures/activities have to be justified and approved before any allocation is made.

No differentiation: HEI unding formulas do not recognize differences between institutions of higher learning. Most HEI funding formulas fund similar programs at similar levels thereby removing the complexity of having to fund institutions or programs based on the sizes of the institutions, the contents of their different programs or on other differentiating factors amongst institutions.

Linearity: Higher education funding formulas show some form of linearity between an institution's base factors and its resource requirements.

Why formula funding model: The formula funding model has gained a lot of users due to its acceptance in public budgeting. Budget requests have been made much easier by using some mathematical expressions in their requests and allocations. This has therefore made allocations to be neutral, rational and equitable, thus reducing the possibility of frauds and manipulations by administrators (Moore, 2003). Using a standard formula has made allocations to be less controversial and politically more acceptable, not only to the institutions but to the general public.

Funding formulas are also precise and accurate in their application, thus minimizing national budgeting sessions. Institutions have a fair assurance of an anticipated minimum funding level thereby making them to plan their operations adequately based on their perceived fiscal certainty. The model, according to Noe (1986), accommodates differences between costs (fixed and variable costs) thereby providing equity, adequacy and propriety in further redistributing resources within an institution.

However, the issue of complexity has been identified as a problem associated with formula funding (Fazekas, 2012). The major fear, according to McKeown-Moak (1999) is whether the formulas will be able to accommodate changes in different variables, especially enrollment changes. Will the formula be able to accommodate increases, decreases and stability in enrollment, simultaneously? Technically, formulas have also been criticized for their inability to adequately predict the estimated cost requirements of some university programs thereby leading to inequities in allocations and difficulties in reconciling policies issues of government regarding some programs (Strehl *et al*., 2007).

RESULTS AND DISCUSSION

Developing a sustainable funding method: There is the need to be cautious in selecting HEI funding approaches. To this effect therefore there is the need to identify and train qualified personnel to supervise the productivity increases needed for accelerated economic development, especially in developing countries (Salmi, 2013). A vibrant higher education system is an economic necessity therefore, an effective and sustainable HEI funding strategy/method will not only support the positive expansion of the HEIs but it will also support their qualitative improvement. These strategy as noted by

Layzell (2007) and Salmi (2013) is expected to amongst others, mobilize sufficient resources and apply effective and innovative allocation mechanisms to distribute these resources. In doing so, the selected mechanisms must be able to ensure that the public funds used on the HEIs are distributed equitably across all institutions. An effective distribution mechanism, according to McKeown (1996), must be used for budget development and not for budget control. It is also expected to be flexible, verifiable, consistent and must reflect objective national trends.

Impacts of formula funding mechanism: Most discussions on HEI funding formula presumes that the model allows the institutions the latitude to deploy their allocated resources between specified programs. This however is not the case due to divergent national policy issues. While in the US, the HEIs have the autonomy of applying their allocated resources according to their needs, the case is not the same in Europe, especially in England (Fazekas, 2012) as the government has shown clear resentment to the ways schools are spending public funds allocated to them freely. The government thus introduced some targeted funding programs whereby spending decisions on such programs are clearly outlined and controlled.

CONCLUSION

Higher education funding formulas are being used internationally as the basic platforms for budgeting and allocating scarce public resources to achieve national higher education objectives. These allocation formulas are at best, measures of the economic relationships between the HEIs and the government. Although, formulas differ between nations and also varies on some basis, their characteristics are however the same. Besides being complex and zero-based they also use same basic factors, like enrollment in their applications.

The effectiveness or otherwise of funding formulas, to a large extent, translates the intent or the focus of a nation's policy on education. Thus, when applied prudently, formulas will guarantee, at least, a minimum level of educational attainment for all citizens. Formulas have also been accepted by many countries due to their objectivity and openness. It should however be noted that when the variables in any given formula proves susceptible, then the effectiveness of that formula will be greatly eroded and may render it ineffective.

ACKNOWLEDGEMENTS

The researcher would like to thank the Universiti Tun Hussein Onn Malaysia and the Ministry of Education Malaysia for supporting this research under the Exploratory Research Grant Scheme (ERGS). In addition the researcher would also like to thank the respondents that give their full support in this research.

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