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Budget Allocation Formulas: Magic or Illusion?

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Monographic allocation formulas have been a collection development tool for over 80 years. An obvious appeal of allocation formulas is the confidence their apparent mathematic rigor inspires. A rational formula seems the very antithesis of whim and caprice. It is hardly surprising, therefore, that so much print has been dedicated to designing library budget allocation formulas over the past decades. Yet allocation formulas present their own dangers and do not guarantee the equity or even the practical economic results sought by their creators. Formulas that are not fixed to specific economic goals will likely do more harm than good.

Allocation formulas reflect an array of subjective values. Their output is not the desired objective set of data, but rather the outcome of subjective values acting on input. In a future column I will argue that adopting an allocation formula limited only to monographs (books) generally reflects an economic model that would be rejected when viewed abstractly as a an economic principle. In this column I will focus exclusively on the irrationality inherent in formulaic allocation.

The outcome of any allocation formula depends upon the input. A formula will derive the solution it is designed to derive based solely on the factors used as input. The actual solution generated by the formula is not as interesting or as important as the factors included in the formula and the weight given to each of these factors. The solution may be infallible and absolute, but this very same solution reflects nothing more than the value judgments applied to the input data. This is not a new or even controversial statement, but it bears repeating since it so central to every discussion of allocation formulas. Werking, in his article *Allocating the Academic Library's Book Budget*, offers a succinct review of the allocation debate that began almost 100 years ago. He cites a 1938 article by the mathematician H. Stetson who stated that, due to the subjectivity of the input in an allocation formula, "…there is no magic in a formula. The results are entirely dependent of the makeup."(Werking 1988)

Let's make this more specific. Suppose that my university library produces circulation records by LC call number well in excess of 2,000,000. Enrollment at my university averages around 20,000. In any straightforward, unweighted, formula the usage statistics will far outweigh enrollment--to the point where enrollment becomes an

insignificant factor in a formula. The disparity between the two factors only grows broader, thus worse for enrollment, each passing year. For example, when circulation records total 4,000,000, but enrollment still averages around 20,000 the ratio of enrollment to check-outs has gone from 1/100 to 1/200. The more complete circulation and usage record-keeping becomes, the greater will be the data disparity between these two factors.

Circulation statistics are arguably the only significant factor in a budget allocation formula, and circulation unquestionably bears the preponderance of empirical data. To place this in the strongest terms, circulation, tied as it is to call number, offers detailed data about which subjects and topic are in high demand, and which are not.

Yet circulation records rarely serve as the sole or determining factor in monograph allocation formulas in library literature. Recognizing the preponderance of data for circulation and seeking a "fuller" formula, the literature is filled with formulas that assign different weight to the various factors in their computations. It is this need to *weigh* the elements of the allocation formulas that gives rise to the vast permutations witnessed in the literature. It is also while assigning different values that we best see how the subjectivity of input determines the output. With any formula the two primary questions are "what factors are used?" and "how much weight should each factor bear?"

The latter question--how to weigh each variable of a formula--has occupied much of the past library literature on budget allocation formulas. The actual variables or factors used in allocation formulas are not as extensive as one would expect. Statistical analysis of published allocation formulas in library literature demonstrates that even though numerous factors are discussed, the majority of formulas rely on the same four items: circulation, enrollment, cost, and the number of faculty. (Canepi 2007)These items can be further reduced to the basic headings of *Supply*, *Demand*, and *Cost*, with enrollment and faculty both folded into the category of *Demand*. William Walters in his article on fund allocation argues further that *supply* and *cost* are static or single-element variables, while *demand* is a multi-varied factor. (Walters 2008) Essentially, *demand* is the only factor requiring extensive analysis in the budget. Certainly, only *demand* represents the individual identity of any academic library. Every library can

start its equation with two of the three factors fixed by outside forces: namely, how many books have been published and how much do they cost? These factors can be treated as constants. The one unique factor in any allocation formula will be the answer to the questions: "what resources have been used at this school or university, and what should I buy?" *Demand* and its assigned weight among the other factors represents the uniqueness of any allocation formula, since it alone reflects the particular circumstances of any academic institution.

Still, Walters' assessment contains one important flaw. Anyone implementing a budget allocation formula should pause at the characterization of *cost* as static and fixed, even setting aside the fluidity of book price inflation. *Cost*, as frequently discussed in budget allocation literature, is unempirical and unspecific to any academic library. The problem with static *cost* in a formula is that this number is generally derived from reports generated by two or three book vendors, or from some other generalizing source (Stebelman 1996). Yet it is irrelevant for individual libraries to adopt the average cost of books with any particular call number. Cost on some theoretical, generalized, scale has little bearing on the particular cost of the books purchased and subsequently used by any particular library. The idea behind the allocation formula is to create a monograph budget for a particular environment. Mixing specifics like *demand* with generalities such as theoretical *cost* risks badly skewing the outcome.

Suppose a university that has no medical school does have an extensive nursing department offering a professional degree. Because there is no medical school, the library does not use the National Library of Medicine Classification System. Rather, the Library of Congress call number "R" is used for all books on medicine. *Nursing* proper is assigned the LC call number "RT," but professional medical care overlaps all manner of diseases and treatments that are assigned different "R" derived call numbers. According to the annual report by YBP entitled *LC Subjects: Trade and other publishers,* academic books grouped in the call number "R" cost an average of almost $99, while nursing "RT" titles cost $58 (Yankee, 2010). Which number should be factored into the equation? Further, a vendor such as Yankee Books reports only 299 books published with call number "RT," while the "R" classification includes approximately 4700 books. Is it proper to adopt the formula for the 299 books in "RT" or for all 4700 in the classification

"R"? Finally, book vendors often give preference to hardbound over softbound books, even though many libraries long ago reversed this preference to stretch funding. The point is that unless *cost* is a number empirically derived from the cost of the books actually purchased and used it has little established relevance to a library's actual need and use. The library may budget for expensive medical books while the populace is merely interested in test-preparation guide books. *Cost* as an element, therefore, is either a static classification in a library's allocation formula--with great potential to skew the results towards high-priced books--or it is simply a subset of the overarching classification of *Demand*.

The more abstract the book budget allocation formula becomes--the less grounded in an actual environment--the more skeptically it should be viewed. If a formula is to rely upon an empirical foundation then circulation data must be paramount in any book allocation formula since *usage* is the sole determining factor for assessing the audience and need for any collection.

Some argue that records of the past are no indication of future desires or needs. Such opponents of "usage" fail to follow this logic through to its inevitable conclusion, which would be that it is impossible or irrational to create a budget. The very notion of a *budget* assumes a continuation of past regularities into the future and future contexts. The future may not exactly be like the past, but from a purely pragmatic perspective we act as if familiar patterns will persist and will bear enough a resemblance to the past that present and future events will not all be unique surprises. In short, you cannot talk about a *budget* at all if you reject the pattern of the past. If, on the other hand, you accept historical patterns as basis for future predictions, you accept that past use *is* an indication of future need.

Book budget allocation formulas can serve as a tool for fund allocation, but too often too much is demanded from them, and they are applied too broadly. The objectivity of formulas is mostly illusory, since they are only as objective as their input factors. The sheer volume of allocation formulas over the past eighty years demonstrates an inherent dissatisfaction with the results these formulas produce. This dissatisfaction is expressed in the library literature by the *caveat* in every article about "how we

implemented a formula." This *caveat* is the immediate recognition, once the formula has generated its results, that something is seriously amiss with the outcome. Somehow the formula produced results that not only were unexpected but clearly wrong when measured by the expectations of experienced librarians.

The experience described by the University of Windsor perfectly illustrates the conundrum faced by academic librarians examining a formula's output. At Windsor, general trends:

> …were the same regardless of the model that was applied. Specifically, certain funds (notably Mathematics, Computer Science, and the five Engineering funds) would receive significant increases whereas others (English, History, Languages) would have been hit with very significant decreases.

In this case the *caveat* meant adding steps to "... mitigate the potential negative distributional impacts that would have resulted with a strict application of the formula...." (Kaay, 2008) It was not that the formula was wrong--it was just wrong for that particular situation. In the end the only test of any budget allocation is not its aptness to *any given* situation, but its aptness for *this* particular situation, *this* library, *this* community, *this* fiscal year. Budget allocation formulas can be useful, but their usefulness is far more restricted than generally appreciated. The magic of budget allocation formulas is the illusion of mathematical objectivity.

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