THE ALLOCATION PROBLEM

AND

THE NECESSITY OF ALLOCATION

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INTRODUCTION

Arthur L. Thomas has published three research studies on the financial cost allocation in general and depreciation allocation in particular. In the first, "The Allocation Problem in Financial Accounting Theory", published in 1969, he concluded that the allocation traditionally made in financial accounting are arbitrary and should cease. In the second, "The Allocation Problem: Part Two", published in 1974, he concluded that financial accounting's allocations are not only arbitrary but also incorrigible and, again, that they should cease. The third, "The FASB and the Allocation Fallacy", published in 1975, he concluded that the allocations can neither be refuted nor verified and FASB should eliminate allocations.

The intent of this paper is to explore the allocation problem as viewed by Thomas and to examine the purposes for which overheads are allocated to products or divisions to see if those purposes are being achieved.

Specifically, the areas this paper will follow are:

I. Exploring the allocation problem as viewed by Thomas.

II. Examining each of the following supposed purposes for which overhead are allocated to see if the allocation overhead is necessary for their achievement.

1. The costing of inventories of stocks on hand for inclusion in annual statements of income and balance sheets.
2 - The costing of products as a basis for pricing.

3 - The evaluation and control of managerial performance.

III. Conclusion.
I. **THE ALLOCATION PROBLEM**

Allocation in accounting can be defined as:

1) The assignment of costs, revenue, income, cash flows, or funds flows to individual inputs or groups of inputs to the firm, including assignment to individual periods of time, divisions of the firm.

2) The division of any total into parts.

3) The assignment of costs to revenues, called matching.

From this definition, it should be evident that allocation is an integral part in the process of assigning numbers to assets, liabilities, expenses, revenues (i.e., the valuation process). Furthermore, the process is less than precise and often ambiguous. 

Thomas proposed three criteria which should be net when making allocations: 1) Additivity, 2) Unambiguity, and 3) Defensibility. Otherwise, allocations are arbitrary or lack theoretical justification.

**Additivity:** According to this criteria, the whole should equal the parts; the allocation should exhaust the total, dividing up whatever is there, no more and no less. 

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Unambiguity: This criteria states that an allocation method should yield a unique amount. One should not be at a loss for how to allocate. A clear approach should be evident and determinable in advance. In effect, the accountant should not be able to choose a particular allocation method for the purpose of creating a desired effect. (3)

Defensibility: This criteria is the most important. It says that once a person chooses an allocation method he or she should be able to provide a conclusive argument for choosing it, defending the method against all possible alternatives. This criteria implies that not only must the purpose for allocating be defended, but also the allocation method by which this purpose is to be accomplished. (4)

A critical aspect of Thomas's criteria is that an allocation method must be defensible against all available alternative; it is not sufficient that a method be defended as "reasonable" or "appropriate" or "useful" or "as good as" or "no worse than" an equally indefensible (or defensible) alternative method.

If two different methods give two different depreciation charges for a given year, resulting in two different income figures, then rationally, one must be superior to the other, or yet a third method superior to both.

"If allocation method is to be theoretically justified, it should be possible to specify unambiguously and in advance the method to be used, and to defend that choice against all competing alternatives. At present, whatever approach one adopts to financial accounting, there usually will be a variety of conflicting methods, all of which seem consistent with what one is trying to accomplish: the allocation problem is one of an embarrassment of riches." (kp)

In supporting his proposition, Thomas began by dividing all nonmonetary economic goods into three classes:

(1) **Unlimited life goods**: Those regarded as having unlimited service life, with no allocation of cost being made until disposition.

(2) **Single-year goods**: The services are expanded upon acquisition and the total cost charged to the period of acquisition.

(3) **Multi-year goods**: Those yielding services to the entity during at least one year subsequent to acquisition. The cost must be allocated to these periods.

These multi-period goods give rise to the allocation problems -- building, equipment, inventories, prepayments, research and development expenditures, advertising.

Thomas concluded that depreciation methods fall into two categories:

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(1) Those that are essentially arbitrary, in that no attempt is made at theoretical justification. A completely arbitrary choice is made.

(2) Net-revenue. Contributions approaches. Under this approach ...

"One estimates the services that the input will provide in current and future periods, then reports the input of an amount that reflects all services yet to be received, depreciation for any period reflects services deemed to have been received during that period."(6)

According to Thomas, the contribution allocation cannot also be theoretically justified whenever the inputs to the revenue-generating process interact in producing the revenue to the entity. Thomas demonstrates this point as follows:

"Inputs interact in producing output, revenues or cash-flows whenever the amounts produced by the inputs working together differ from the total that these inputs would have produced working separately. Input interaction pervades the business world. Workers and machines that are employed together produce far more output than would be produced if workers made things by hand and machines were untended. The combination of buildings, workers, and machines generates more output than the total of what would be produced by empty buildings, and workers, and machines exposed to the weather."(7)

Accordingly, in the presence of input interaction, the Net Revenue-Contributions approaches to depreciation will be arbitrary.


(7) Ibid, p. 16.
The question which must be raised is: Could depreciation be calculated in an unarbitrary, justifiable manner in the case of absence input interaction? Thomas's answer to this question is No because Net-Revenue Contribution depreciation methods have inherent in them an assumption that the rate of return involved in constant from period to period and this constant-rate assumption is arbitrary, and these depreciation methods, therefore, are arbitrary. So even if there is no interaction, the depreciation allocation still will be arbitrary.

Thomas concludes in his study that those allocations which are dependent for justification on the presence of a unique and identifiable cause and effect relationship are arbitrary by not meeting the additivity criteria, which is violated in the present of input-interaction. However, his conclusion as to the arbitrary nature of the constant-rate assumption can be argued on the ground that the assumption is consistent with the model as used in the decision-making context. Leonard Eckel states that:

"Thomas declares the assumption of the constant-rate to be arbitrary essentially because a choice must be made. He makes no attempt to address himself to the question of whether some other assumptions might be defensible, and he ignores the simple fact that the constant-rate assumption can be supported by an appeal to the consistency between decision model and results reporting. Here, Thomas implies that the existence of any choice necessarily implies arbitrariness, and in an accounting-significant sense. If this is his intent, then it is not unlikely that certain allocations which are clearly
arbitrary to him will be acceptable to both accountants and statement users. Consequently, the potential influence of his conclusion on the development of accounting is lessened.\(^{(8)}\)

Furthermore, Thomas claims that his conclusion of arbitrariness applies to all multi-year goods allocations. In other words, no application of net-revenue contributions approach to any asset can be theoretically justified. He discusses the inventory as an example:

"A bit more needs to be said about inventories. Usually supplies, merchandise, raw materials, and finished goods are acquired in batches, or lots, rather than by the individual item. In this sense, material may be allocated to more than one year, or to several other economic goods. An advantage to perceiving things this way is that it becomes evident that the accountant's problems with differing inventory and depreciation methods are really forms of the same allocation problem—though, as it were, at different points along a continuum. (In both cases the problem is to determine what portion of an acquisition price should be associated with each of two or more periods.) Our previous discussion has concluded that all nonmonetary economic goods are part of the same continuum and subject to the same allocation problem, no matter how short the period from their acquisition to the point at which the accountant treats their services as exhausted." \(^{(9)}\)


Thus, to the extent that inventory allocations depend for justifications on such an approach, they too are arbitrary. However, do inventory allocations necessarily depend on that approach, or might there be other defenses?

Eckel Leonard answered this question as follows:

"It would seem that the specific identification method of determining cost of goods sold will yield a theoretically justifiable result. Here, the amount of cost which is to be allocated is known for each contribution--producing item, and costs are charged to the period in which the revenue potential has been experienced. Thus, the amount of cost to be matched is not a function of the amount of revenue contributed by the item. The total item-cost will be charged to the period in which the revenue is recognized, regardless of the amount of that revenue. Accordingly, the inability to make the contributions allocation is not relevant, and inventory allocollon are not necessarily arbitrary."

A seemingly promising approach to defending an allocation method is to consider its purpose. Thomas states:

"(1) The purpose of the allocation: For an allocation to be theoretically justified, the allocator must specify a well-defined objective that the partitioning is to serve - usually, this will be the objective to be served by the entire report of which the allocation is part. The allocation must obtain agreement from others that this objective is an appropriate one for financial accounting to serve.

(2) The algorithm that accomplishes this purpose: The allocator must then provide

the algorithm that accomplishes this purpose. As a minimum requirement of any partitioning of a set, this algorithm must unambiguously divide the total to be allocated into mutually exclusive subsets.\footnote{10}

Thomas requires that the objective be defined so that only one result will meet the objective. Accordingly, where the objective is defined so as to support a number of effective algorithms yielding different results, that would be considered an indefensible objective, even though all results satisfy the objective.

In the ordinary sense, this argument in this point is not convincing because a "method of allocation" includes both algorithm and objective, and any method might be found arbitrary for many reasons:

(1) The objective is not defensible on its merits;
(2) The algorithm is not effective, although the objective is complete;
(3) The objective, while "good" is not so defined as to allow the generation of an effective algorithm yielding unique objective - satisfying results.\footnote{12}

It is clear that Thomas rejects any such approach on the basis that the purpose of income reporting is not

\footnote{11} Thomas, L. Arthur, \textit{ARS No. 9}, p. 5.

well-defined and on the ground that there is no agreement on a specific purpose for financial accounting. As Eckel said:

"It is inappropriate to go directly to the purpose of reporting. We do now have a concept of accounting income which void yield unarbitrary allocations."

(13) Ibid., p. 775.
II. **THE NECESSITY OF ALLOCATION:**

A logical question at this point is ... why do accountants proceed to allocate accounting costs if they are arbitrary? It is difficult, if not impossible to ascertain the purposes for which overhead costs are allocated to products in practice. But an examination of cost accounting text books widely used suggests that the purposes may be classified, broadly, as follows:

(1) The costing of inventories of stocks on hand for inclusion in annual statements of income and balance sheets.

(2) The costing of products as a basis for pricing.

(3) The evaluation and control of managerial performance.

I will examine each of these supposed purposes to see if the allocation of overhead is necessary for their achievement.

1. **Inventories and Financial Statements**

Section 1024 of the AICPA states that:

"The objective of particular financial statements are to present fairly in conformity with generally accepted accounting principles (1) financial position, (2) results of operations, and (3) other changes in financial position. .1(14)

Within this section is compressed the purpose for which published accounts are prepared - which is to enable people

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not directly concerned with the day-to-day management of the company to form some opinion as the company's income and present state of affairs. For that purpose, the statement of affairs must be truly and fairly represented. The phrase "true and fair" has been the subject of discussion, and it would be tedious to repeat that discussion here.

It might be argued that measuring the amount of inventories of goods on hand by their existing market prices are objective; they are public knowledge; anybody can obtain information on the prices ruling in the market place for goods in varying quantities, and of varying qualities. And so the prices used to measure the quantity of goods of a particular quality on hand at a stated date can be verified. Accordingly, measuring the amount of inventories of goods on hand does not require the calculation of any "cost" - either of production or of acquisition, and since the allocation of overhead is not necessary.

In fact, the measuring of the amount of inventories by the existing market prices of the goods is neither an accepted, nor an acceptable method of accounting. Traditionally, the measurement of inventories at market prices has only been accepted when those prices were less than costs. The measurement of inventories of current market prices should be rejected on the ground that:

(1) Market prices are always more subjective than cost.

(2) There is no effective government-controlled market at a fixed price. In other words, there is no existence of a controlled market with a fixed price applicable to all quantities brought to the market.  

(3) In many instances market prices do not exist.  

(4) The use of market prices implies the recognition of unrealized gains.  

It is clear that, at least, one of these situations will be existent and nobody can ignore the probability of their existence. Thus, we can conclude that the allocation of overhead costs is necessary in achieving the costing of inventories of stocks on hand for inclusion in annual statements of income and balance sheets.  

2. **Pricing of Goods for Sale**  

For the purpose of this discussion on the pricing of goods or products, I will adopt Wiles classification of firms into price-takers and price-makers. This is not an altogether unsatisfactory classification, being rather blurred at the margin. It will, however, suffice for the present discussion.  

Price-takers are firms which accept the price ruling in the market for the goods they have for sale. It is quite normal for firms to maintain price differentials

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while adhering to the general pattern of prices accepted in the market for that class of goods. Similarly firms may justify a price difference by differentiating the product slightly. Pricing in this case consists of judging the extent to which the price can be differentiated without on the one hand causing retaliatory price-cuts by competitors, or on the other hand, losing custom because the price is too high. Here, it is quite true that the price is decided upon in relation to these market factors, the only problem faced with the price-taker is production decisions: whether or not to produce the good, and in what quantities.\(^{(18)}\)

However, the problem facing price-makers (which are taken to include monopolists, contractors and manufacturers of unique products) is of different kind. In this case, there is no readily ascertainable market price for the goods. The seller should depend on the cost of goods or products for determining the price. So allocating overhead costs is necessary in achieving this price. Horngren states that:

"When no outside market prices exist, cost allocation often serves as a means for determining a "fair" or "equitable" price. Many examples can be found in the area of government contracting, where the price is a function of the company's costs."\(^{(19)}\)

\(^{(18)}\) Ibid., p. 93.

Accordingly, there is no justifiable way for conduct, ing that allocations should cease. Indeed, there is a great need to allocate the overhead for determining the price, at least, for the price-maker firms.

3. **Managerial Performance**

The allocation of overhead costs to divisions or departments as part of the procedure for evaluating the performance of division or of divisional managers has been the subject of some discussion.

Some accountants argue that some costs, such as central corporate costs, should never be allocated on the ground that there is no cause-and-effect relationship, and also if the administrator is to be held accountable for the costs of his department, those costs must consist only of the items over which he has control - i.e., costs that he can alter by his own decisions. \(^{(20)}\)

However, many costs are controllable only at the higher levels of organization, some are almost completely beyond control even by top executives.

The other side of the argument favor the full allocation of costs. They introduced the following:

1) The full allocation of costs makes the managers aware that the support of much of the entire organization is necessary for an individual responsibility center to run smoothly.

2) The danger of overstatement of costs is less than that of understatement. For example, if costs are fully allocated, managers are less likely to cut prices, to underbid, to be inefficient, to overexpand.

3) There are also important effects on the morale of the service department employees. That is, if the other departments are not charged with service-department costs, the service-department staff is likely to feel that it lacks the status of first-class citizenship as an integral part of the organization.

4) Managers generally do not get too concerned about such allocations as long as all departments are subject to a uniform cost-reallocation procedure. (21) Furthermore, in practice it is still widely accepted as a necessary part of evaluation procedures. Solomons reports that:

"Most company executives are aware of these arguments against expense allocations but are not always convinced by them." (22)


III. CONCLUSION

Thomas proposed three criteria which should be met when making allocations: 1) Additivity, 2) Unambiguity, and 3) Defensibility. Otherwise, allocations are arbitrary or lack theoretical justification.

It would seem that Thomas formulated these criteria to fit the specific case to which they were going to be applied, the depreciation allocation. He demonstrates that depreciation methods fall into two categories:

(1) Those that are essentially arbitrary, in that no attempt is made at theoretically justification.

(2) Net-revenue-contributions approaches, which can't be theoretically justified whenever the inputs to the revenue-generating process interact in producing the revenue to the entity. In addition, this approaches to depreciation will be also arbitrary in the absence of interaction because they have inherent in them a constant-rate assumption.

The promising approach to defend an allocation method is that, the allocator must specify a well-defined objective and then provide the algorithm that accomplishes this purpose.

However, he concluded that financial accounting's allocations are not only arbitrary but also incorrigible and they should cease. Thus, examination of each of the following supposed purposes are made to see if all allo-
cations of overhead is necessary for their achievement:

(1) The costing of inventories of stock on hand.
(2) The costing of products as a basis for pricing.
(3) The evaluation and control of managerial performance.

By reviewing of the accounting literature, I found that allocation of overhead costs are not only acceptable but also necessary.


