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OVERHEAD COSTS OF PRODUCTS--

ACCOUNTING AND MANAGERIAL VIEWPOINTS

By

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Accounting and Managerial Viewpoints

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The purpose of this study is to survey and examine critically a variety of concepts of overhead cost assignments to products in view of several purposes for which product cost information is required. Justifications for such a study are as follows: (1) overhead costs represent a substantial portion of total costs of manufacturing enterprises, (2) the association of overhead costs with product units has a significant effect upon net income calculations and inventory valuations, (3) management functions and many management decisions should be based, in part, upon product cost information, and (4) controversies and some misunderstandings exist among both accountants and business managers in the area of overhead costing.

The general problem of overhead costing of products is examined and the historical development of product overhead cost concepts is traced in the first part of the study. This is followed by a discussion of overhead costing of products as it relates to professional accounting with its emphasis upon income calculation and inventory valuation. It is shown that reported net income varies in direct relationship with changes in the overhead cost content of inventories. No conclusions may be drawn with regard to relative conservatism of various concepts of product overhead costs. Over the long run all concepts yield the same income result, but the concept used may be

a material factor in annual and shorter-period calculations of net income.

It is concluded that for financial accounting purposes (1) there is no rational basis for the by-passing of the product cost category by all production overhead costs, (2) circumstances often make it inappropriate to assign all recorded production overhead costs as product costs during a period of a year or less, (3) behavior patterns of certain overhead costs are not necessarily relevant to the problem of tracing costs to inventoriable product units, and (4) long-run expectations of plant utilization and operating efficiency provide the most appropriate bases for determination of overhead charging rates.

The third part of the study relates to the problem of harmonizing historical net income figures with those provided by break-even types of analyses. A technique is developed to enable short-term forecasting of profits as a function of both sales and production volumes and to assist in the understanding and interpretation of net income computed by conventional and generally accepted accounting procedures.

In a final section of the study product overhead cost concepts are examined from management's viewpoint. Special emphasis is given to product cost concepts most useful for pricing decisions and for the control of costs. It is concluded that for pricing decisions (1) overhead cost information should involve projections of future costs, (2) under many if not most circumstances an awareness of incremental unit costs is essential, and (3) long-run price policy should be based,

at least in part, upon total product cost calculations including overhead costs in order to maximize over-all profitability.

In the area of cost control overhead cost concepts should be used to motivate responsible employees and provide variance data for the administration of cost control plans. In general, it is concluded that full standard overhead costs based upon a reasonably high performance level at anticipated volume provide the optimum motivation, at least at the lower echelons of management, and that standards based upon a similar performance level at a practical capacity volume provide the most useful over-all variance information.

PREFACE

One of the most controversial areas of accounting and managerial analyses relates to the association of costs with products. An important and troublesome phase of this problem involves indirect or overhead costs. The past decade has witnessed a rapid influx in the absolute amount of business overhead costs so that the significance of this problem has increased.

Although much controversial literature is available on the subject of overhead costing of products, most of it advocates or criticizes a particular technique as an all-purpose tool. It, therefore, seems appropriate to explore the various concepts of overhead costs of products from several viewpoints in an attempt to clarify the problems involved and to encourage a re-examination of the entire area of overhead costing.

Several controllers and other executives of industrial corporations in the Detroit and Toledo areas discussed with me their problems of overhead costing and thus contributed to the preparation of this dissertation. Professors Herbert F. Taggart and William J. Schlatter of my doctoral committee read and reread drafts of the dissertation and were exceptionally helpful in suggesting many improvements. Other committee members--Professors Olin W. Blackett, Franklin G. Moore,

and William B. Palmer--read the manuscript and offered many constructive suggestions for its improvement. To these individuals and others I am indebted.

R. Lee Brummet

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CHAPTER I

INTRODUCTION

Current accounting practice and statistical analyses which utilize information produced by accounting methods are based on many and widely varied concepts and in some instances misconceptions and apparent inconsistencies. One such subject area which ranks high on the list in terms of frequency and significance is that associated with the term "product costs" as used by manufacturing enterprises. There are, of course, minor inconsistencies in product cost concepts which stem from differing treatments of direct material and direct labor costs, but a much more significant area accounting for the lack of uniformity in meaning of the term "product costs" is to be found in the handling of overhead charges. It is this area with which this dissertation deals.

Current Increased Importance of Accounting for Overhead Costs

There was a time not too many decades past when the problem of assigning overheads to products was of little significance to accountants and business managers. Costs of doing business in a manufacturing enterprise were primarily attributable to the purchase of raw

materials and the payment of wages to employees who converted, largely by hand, such raw materials into finished products to be sold. The assignment or non-assignment to products of the costs of fixed plant and equipment, and other types of costs which were only indirectly associated with units of product, had little effect upon the measurement of income and the valuation of inventories. The increased mechanization of the last half century in this country, the emphasis upon mass production-line techniques, and more recently, the rapidly growing trend toward a high degree of automation with labor-replacing machinery have changed this picture. Today the cost of physical facilities is of great importance in the producing enterprise, and the obsolescence factor, fostered by a rapid rate of technological progress, is likely to perpetuate, if not increase still further, the significance of these indirect cost elements.

Developments on the labor scene have also added to the increased significance of the problem of handling indirect costs. When labor was paid on an hourly basis with relatively few fringe benefits, and when the employer had a relatively greater degree of freedom to lay off and rehire employees, labor costs fluctuated in close relationship with quantities of goods produced and direct assignments to products could be made readily. Today, however, the employer is committed to pay pensions, payroll taxes, insurance, and only recently, guaranteed wages whether working time is applied or not. These elements have

also increased the absolute amount of overhead costs and the proportion of overhead types of costs in relation to total costs of doing business.[1]

Manufacturing as it is now and is likely to continue to exist in this country involves a preponderance of fixed, indirect, overhead-type costs with a diminishing proportion of direct variable costs. Thus the problem of handling of overhead costs has attained a high level of importance to both accountants and business managers.

Need for an Understanding of Overhead Cost Associations with Products

Stockholders, potential investors, governmental agencies, and even casual readers of financial statements of industrial corporations either consciously or unconsciously bring to play a concept of product costs when they read and, in some cases, try to interpret the meaning of the caption "cost of goods (products) sold" on income statements and "work in process" or "finished goods" inventories on statements of financial condition. These concepts may range, with understandable justification based on individual experiences and exposures to accounting practices, from a representation of the sum of direct production costs

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[1] These statements have been born out by attitudes expressed by several business executives in interviews with the author and by data on operations of several firms in diversified industries in the Detroit area. One manufacturer, for example, reports that manufacturing costs include material, labor, and manufacturing overhead in the relationship of 20%, 30%, and 50%, respectively, with the latter element continuing to increase as a proportion of the total.

applicable to product units involved and reasonable prorations of indirect production costs and selling and administrative costs to representations of only direct production costs or even only raw material costs associated with product units involved.[1] Such a wide range of possible interpretations makes obvious the need for a greater degree of uniformity of practice or at least for full disclosure by footnotes or parenthetical comment of the concept used on individual reports. If public accountants are to fulfill their most important service objective of providing meaningful and useful financial information, some action in this matter is in order.

Discussions of problems of production efficiency, price policy, plant expansion or contraction, product diversification, product mix, or any one of many other problems confronting management personnel of industrial organizations inevitably use the term "product costs" with the implication of a definite meaning or content. Cost accountants and business executives alike have, within the past two or three decades,

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[1] The divergence in accounting practice in this area is apparently not due to a lack of awareness of its existence. The problem was recognized by A. Hamilton Church some fifty-five years ago. Writing in 1901, Church speaks of problems of inventory valuation and observes that "there appears to be no sort of uniformity of practice with regard to this matter. In some cases prime cost is taken as a basis for reckoning, in other cases arbitrary percentages are added, and even in these latter there is a divergence of practice. Sometimes they are added to time only, sometimes on prime cost, but in no case, within my knowledge is any attempt made to discriminate between various classes of manufactures." A. Hamilton Church, "The Proper Distribution of Establishment Charges," The first of a series of six articles, The Engineering Magazine. (July, 1901), p. 515.

become more and more aware of the problem of semantics inherent in such discussions and have become more and more careful to explain their concept of the term when it is used. They have also concerned themselves with the determination of an appropriate concept for the discussion at hand and thus recognized the existence of varied concepts without condemning any of them.

Yet the problems of semantics presented by the use of the term "product costs" and the problem of devising appropriate concepts of product costs for varied types of managerial analyses are far from being completely solved as they relate to internal business management. Sufficient time and attention must be given to assure accurate definition of the term "product costs" in each instance of its use in order to assure accurate communications and sound decisions based on mutual understanding. Useful and precise concepts are needed for specific purposes so that appropriate business decisions may result. Thus it seems that the absence of clear-cut definitions of product costs is unfortunate both from the standpoints of external and internal reporting and analyses.

Product Costing as a Phase of Costing Generally

Another problem of semantics often arises, although it is not always recognized, when areas of cost accounting, costing studies, and product costing are treated. Cost accounting may be defined broadly

to include methods and techniques of analysing and synthesizing cost information to facilitate accounting and economic purposes. Many, if not most, of these methods and techniques involve the association of specific cost elements with activities, functions, departments, geographical territories, responsibility centers, materials, purchased parts, product lines, etc. Such methods or techniques may be appropriately referred to as costing procedures so that there should be no significant distinction between problems of cost accounting and problems of costing.

The subject of overhead costing of products is limited to consideration only of indirect costs as opposed to directly assignable costs and to associations of these costs with physical product units as opposed to activities, cost centers, etc. Indirect or overhead costs are, almost by definition, more troublesome from the analyst's point of view than direct costs. It is in this area that accounting and managerial problems will continue to remain unsolved. This is also the area in which the greatest potential for useful analysis lies.

Physical product units do not necessarily provide the most useful factor with which to associate overhead costs for all types of managerial decisions and for all accounting purposes. Such an association does, however, provide relevant information for certain types of accounting and managerial problems.

The Accounting Profession's Attitude Toward Concepts of Overhead Costs of Products

The American Institute of Accountants and its Committee on

Accounting Procedure have attempted to establish a degree of uniformity in many areas of accounting which have no more effect upon the periodic income calculation and the presentation of financial condition than does a definite concept of the content of product costs. This Committee, a recognized authority in the professional accounting field, has, for example, issued statements concerning product flow assumptions, amortization of intangibles, and the handling of extraordinary charges and credits. Yet no separate pronouncements have been made by the Committee with regard to the content of product costs for a manufacturing enterprise, and the few references to this subject that it has made have been couched in very cautious language and have exerted very little, if any, effect upon general accounting practice.[1]

The Committee has allowed and, in some instances, encouraged members of the profession to go further than the financial statements per se and make calculations of working capital, current ratios,

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[1] There is some indication of an attempt to rationalize this inaction by passing responsibility to cost and systems specialists. In connection with inventory practices the Committee on Accounting Procedure of the American Institute of Accountants states that "the exercise of judgment in an individual situation involves a consideration of the adequacy of the procedures of the cost accounting system in use, the soundness of the principles thereof, and their consistent application." Restatement and Revision of Accounting Research Bulletins, (New York: American Institute of Accountants, 1953), p. 29. Such a stand seems somewhat weak since those who design procedures for an individual firm may be primarily interested in product costs which may be useful for special managerial decisions rather than appropriate concepts for income determination and inventory valuation. These latter two areas seem peculiarly responsibilities of professional accountants.

inventory turnovers, and gross margin percentage comparisons, and thereby both increase the possibility of varied interpretations and magnify their effects. It can hardly be questioned that the accounting profession has done little to prevent the naive reader from being unconsciously misled and the thorough and informed reader from being confused and frustrated by this lack of a consistent meaning for product costs as used on financial statements of industrial enterprises.

Product Overhead Cost Concepts and the Recording Routine

The determination of a concept of product costs for use in devising recording procedure in a particular system and for use on published financial statements and internal reports of all kinds is often considered to be a single problem. This attitude is apparently based upon the all too prevalent assumption that all accounting reports are nothing more than orderly representations, usually in summary form, of exact magnitudes reflected in general or subsidiary ledger accounts as the cumulative results of routine accounting or recording methods.

Although the usual financial statements and many routine reports to management may be prepared solely by reference to ledger accounts, accountants have no compulsion to limit their representations to the amounts shown in formal accounts nor even to insist upon exact agreement of corresponding items on reports and in the accounts. In fact, accountants should feel an obligation to report useful financial or cost

information without regard to whether or not such information has lent itself or been deemed appropriate for entry in the company's formal records.[1]

Accountants' and businessmen's thinking would be clarified if the recording aspect of accounting with its often false implication of exactness and completeness and its requirement of exact arithmetic balance were de-emphasized and placed in its proper perspective. Any record keeping or recording procedure is merely a logical methodology designed to make possible the orderly accumulation of statistical information with regard to financial effects of activities, both internal and external, of a business enterprise.

This de-emphasis does not negate the importance of such a logical methodology or the accountant's need for a thorough understanding of it, but it should serve to set apart the use of statistical information in the determination of income and reasonable inventory valuations for control reports from the recording process per se. Neither does this

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[1] In an article titled "Cost Accounting versus Cost Bookkeeping," which appeared in The Accounting Review, (April, 1951), Mr. H. F. Taggart discussed the role of the cost accountant as a forecaster and interpreter and how he is often hampered by an unfounded desire for consistency and tieing-in of cost records with general accounting records and reports. He suggests that "cost records themselves are often of little use to management. Management personnel spend little time peering over the shoulder of the cost accountant studying his ledgers and his underlying papers. The cost accountant serves management by means of reports, certain parts of which may be drawn from records, but a large and vital part of which come from sources outside of the books." These suggestions apply, although perhaps to a lesser degree, to general ledger accounts and their relationship to financial statement representations.

segregation of concepts of accounting activities mean that the relationship between financial statements and reports on the one hand and recording procedures and methods on the other hand should, or even may, be ignored. The prime prerequisite for accurate and complete reporting is organized and adequate record keeping of the economic effects of transactions and other less obvious phenomena to which a business enterprise is subjected. Yet the record keeping process is for the most part procedural in nature. It is mechanical. It is a methodology; whereas, net income calculation and asset valuations and their portrayal in at least quasi-formal reports are the results of analyses and syntheses and judgmental decisions which rely upon recorded data only as a point of departure.

The recording process should therefore be arranged so as to provide necessary cost information in the most expeditious and economical manner. Considerations of techniques should be recognized as apart from problems of deciding meaningful concepts of product costs for various needs.

Significant advances have been made in the development of recording techniques in the past half century and especially in the last ten to twenty years with the rapidly growing use of mechanized aids. These advances have made possible greater efficiencies in the recording processes and have increased the amount of basic transactions data which fall within the realm of practicability for recording and

preserving. This latter effect has extended previous boundaries for the use of significant cost concepts. Yet it has only indirectly dictated or led to changes of attitudes toward the content of meaningful concepts. Indeed the evolution of accounting reflects a line of causation which starts with recognition by someone, often not an accountant, of a need for information; the development of concepts which, if measured, would fulfill such a need; and finally, the development of formal or informal recording and analytic techniques which make measurement of these concepts possible. The recording process is an indispensable tool for the determination of the magnitudes of product cost conceptions which are in turn tools for significant interpretations relative to income measurement, determination of financial well-being, and a multitude of problems faced by those who chart the course of business enterprises.

It therefore seems appropriate to approach the problem of determining meaningful product cost concepts with regard to the inclusion of overhead costs by considering effects on the end results with little regard for mechanics by which the various concepts may be given substance. Conclusions reached relative to product cost concepts will doubtless affect and in some cases dictate recording routines. It will be necessary in many instances to explain concepts in terms of the mechanics used in their determination, but it should be understood that these mechanics may be effected either as a part of, or supplementary to, the formal ledger accounts. In some cases complications

involved in record keeping routines will be considered for sake of completeness but for the most part the recording routines necessary to implement the determination of product cost conceptions will be given relatively little consideration.

Outline and Objectives

In Chapter II, an attempt is made to trace the origin and evolution of concepts of overheads and product costs as reflected in financial and cost accounting practices and managerial analyses. Any reasonably complete coverage of this subject would require a volume of considerable size. The attempt here is only to spot certain of the more outstanding developments which when viewed in chronological sequence may provide a general insight into the over-all evolutionary process. It is hoped that such a brief commentary will serve to provide the necessary perspective for viewing objectively current problems of associating overhead costs with product units.[1]

In a second section including Chapters III, IV, and V, consideration is given to overhead costing concepts useful for financial or general accounting purposes in the measurement and forecasting of net income and the valuation of inventories. Chapter III lays the foundation

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[1] For more detailed tracing of the historical development of overhead costing and cost accounting generally, the reader should find works of S. Paul Garner, David Solomons, A. C. Littleton, and Hugh Jackson both interesting and revealing.

upon which to build in developing proper product overhead cost concepts for income determination and the valuation of inventories. Illustrations of several concepts now in use are examined and appraised in terms of their effects upon net income.

In Chapter IV, practical and theoritical justifications for various concepts of overhead costs of products are presented and discussed. Accounting conventions of conservatism and consistency are viewed in the light of product costing concepts and some observations are made with regard to income tax effects of different overhead costing practices. The problems of making short-term forecasts of net income and harmonizing calculated income results with forecasts are treated as they relate to overhead costing in Chapter V.

In a third section of this dissertation, including Chapters VI and VII, product overhead cost concepts are considered from the management viewpoint. Some of an almost unending list of possible management decisions are treated in relationship to product overhead cost concepts. The marketing function is considered in Chapter VI with special reference to product pricing. In Chapter VII, the control of costs is dealt with as it relates to overhead costing.

Chapter VIII provides a summary and conclusion. It brings together the varied concepts of overhead cost association with product units to provide a basis for some degree of consistency of practice along with an intelligent understanding of the use of special concepts for special purposes and to relate further the concepts to record keeping techniques.

CHAPTER II

THE HISTORICAL DEVELOPMENT OF CONCEPTS OF OVERHEAD COSTS OF PRODUCTS[1]

The Period when Overhead Costs Were of Relatively Little Significance--Prior to 1870

It is generally agreed and reasonably well known by accountants that double entry record keeping and the basic foundation of modern accounting techniques had their origin in Northern Italy in the fourteenth and fifteenth centuries. The first systematic exploration of techniques used or recommended during this period is to be found in the work of Luca Paciolo published in 1494. Paciolo's concern and that of other writers in this area who followed him closely was primarily related to buying and selling activities with virtually no consideration for cost or industrial record keeping.

Records of operations of mines in Austria in the sixteenth and seventeenth centuries by the Fugger family provide a notable indication of evolution in the field of industrial accounting. Account classifications

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[1] Although many primary references have been used for the material of this chapter, the writer has made considerable use of secondary references. Two such sources that have been especially helpful are S. Paul Garner, Evolution of Cost Accounting to 1925, (University of Alabama: University of Alabama Press, 1954), and David Solomons, Editor, Studies in Costing, (London: Sweet and Maxwell, Ltd., 1952) Chapter I.

were not clear-cut, yet the concept of cost of production was obviously in the thinking of those using recorded operational data. One finds here the use of the term "prime costs," which still is found in cost accounting terminology.[1] Yet the Fugger accounts can hardly be considered a cost accounting system and there is no evidence of concern for overhead costs as such and their effects upon total production costs.

The Medici and Plantin accounts of the fifteenth and sixteenth centuries which were used to record activities of silk and wool production and of a printing and publishing operation, respectively, offer other early examples of a concern for record keeping related to production costs. But it is difficult to detect any attempts directed specifically toward the handling of indirect costs. Raymond de Roover suggests that the accounts used by the Medici in 1556 provided the possibility of separating overhead costs from other costs of production. However, he points out the relative insignificance of this cost element at that time by stating that

> overhead charges . . . are relatively unimportant as they represent only 10 percent. The overwhelming importance of direct charges, as contrasted with overhead, was to be expected, because burden on fixed investments, like machinery, did not yet play any part in the computation of cost in the sixteenth century. Industrial enterprises were then highly flexible units and could adapt themselves readily to a slacker demand by simply curtailing their volume of production. Each curtailment engendered unemployment,

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[1] S. Paul Garner, Evolution of Cost Accounting to 1925, (University, Alabama: University of Alabama Press, 1954), pp. 6-7.

but it did not necessarily turn profits into losses as would be the case in a modern industrial concern with topheavy overhead. [1]

Many other examples might be cited to indicate early practices vaguely related to production cost accounting, [2] but de Roover points out "that while a hundred or more people wrote textbooks and treatises on bookkeeping topics during the era" . . . (1350 to 1600) . . . "not a single one, so far as the writer can ascertain, felt impelled to describe even the rudiments of industrial accounting." [3] These early systems were doubtless exceptional situations in the period and here only slight glimpses of possible concepts of product overheads are available. This is of course explained in part by the proportionately large component of prime costs, but it seems fair to suggest that the problem of overhead cost assignments did not present itself until a later century with the coming of the so-called industrial revolution.

Several accounting historians have observed the dearth of cost accounting literature during the early decades of the industrial revolution in France, England, and the United States. Ronald S. Edwards, for

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[1] Raymond de Roover, "A Florentine Firm of Cloth Manufacturers," Speculum, (January, 1941), Volume XVI, p. 26.

[2] Garner comments upon recording techniques of Del Bene, Datini, Niccolo, and Bacci, all of whom were textile merchants and manufacturers of Northern Italy in this early period. He also notes the accounts used at the mint at Ragusa in Dalmatia in the fifteenth century. Garner, op. cit., pp. 15-24.

[3] de Roover, op. cit., p. 28.

example, states that

> it is difficult to account for the absence of works on industrial accountancy during the period 1790-1880. Books on commercial accounts were turned out by the dozen, but . . . writers on accounting neglected the problems of the industrial community at a time when the latter was being revolutionized by power, the factory system and the growth of communications. [1]

A few exceptions may be found but they merely indicate, for the most part, an increasing awareness of a need for cost data with meager or no suggestions for means of implementation. In a work of Charles Babbage in 1832, one finds a recognition of depreciation and overhead costs generally, [2] and L. F. G. de Cazaux, in his book on agricultural accounting published in 1824, [3] suggests the assignment of depreciation and other costs to various farming activities. Yet Louis Mezieres, writing as late as 1862, [4] appears not to recognize the existence of overhead costs at all. It is doubtless that cost accounting practice during the first three quarters of the nineteenth century was in advance of that which the literature would lead one to believe since there are several

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[1] Ronald S. Edwards, "Some Notes on the Early Literature and Development of Cost Accounting in Great Britain," The Accountant, (August, 1937), Volume XCVII, p. 254.

[2] Charles Babbage, "On the Economy of Machinery and Manufacturers" as reported by S. Paul Garner in "Highlights in the Development of Cost Accounting," The National Public Accountant, (Accountants' Publishing Company, Inc., March, 1950).

[3] Garner, op. cit., p. 53.

[4] David Solomons, Editor, Studies in Costing, (London: Sweet and Maxwell, Limited, 1952), p. 11.

indications of increased cost consciousness in the business world during this early period. This was an era of considerable secrecy of private business practices and not one noted for external impartial analyses of business problems. Nevertheless, it seems proper to assume that prior to 1870 efforts in the field of accounting for overhead costs were meager and almost entirely limited to techniques or mechanics of their incorporation into a systematic group of ledger accounts with little regard for product costing as such.

The Period of Increased Interest in Overhead Costs and Related Techniques--1870 to Date

The last three decades of the nineteenth century saw an awakening of interest in problems of overhead costs and of cost accounting generally. This period, referred to by one author as marking a costing renaissance,[1] provided impetus for an interest which has continued to the present time. Solomons attributes added significance to the beginning of this era by suggesting that developments divide clearly into two parts as follows:

> The first part, covering the period from the early fourteenth century down to the third quarter of the nineteenth is largely, though by no means only, concerned with bringing the records of industrial activity within the compass of double-entry bookkeeping. . . . By 1875 or thereabouts, that technical problem had been completely solved. The second part of the story . . . is concerned with the broader issue of making accounting records mean something, of making them flexible and capable of providing information . . .

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[1] Ibid., p. 17.

> significant . . . for any of the purposes which . . . figures may be called upon to serve. [1]

This is surely an optimistic evaluation of the status of the developments of cost accounting techniques by 1875; yet one cannot help but be impressed with the understanding on the part of early writers in this area of general business and cost accounting problems which is often thought to be a phenomenon of the modern business world.

There were some rather obvious reasons for this awakened interest. The industrial revolution had become a reality. Problems of business had become more complex with large scale operations replacing localized small activities. Developments of railroads, extractive industries, and the textile industry, among others, and the attending large investments in power machinery and other fixed equipment brought with them problems of overhead costs which could not be ignored. Pricing problems also gained added importance. Industries became more competitive and cost behavior and the relationships between costs and prices gained added significance. Businessmen could no longer limit their concern for production cost information to crude approximations of direct material and direct labor costs.

Notable contributions are so numerous during the period starting about 1870 that it is not practical to attempt to comment upon or even mention all of them. Neither is it appropriate to observe the chronological developments without narrowing the area of problems involved.

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[1] Ibid., p. 2.

In the following paragraphs brief observations are made of developments relating to first, overhead items includable as product costs; second, techniques of applying overhead costs; third, development of predetermined and normal overhead rates and the recognition of fixed and variable overhead costs; and fourth, standard overheads.

Overhead Items Includable as Product Costs

There are some indications of attempts to associate overhead costs with product units prior to 1885, but practices were not in general use. Primary concern was with direct materials and direct labor cost assignments, or with prime costs. In 1885, Henry Metcalfe, in a work entitled Cost of Manufactures,[1] treated "indirect expenses" including only costs which would now be thought of as product costs.

A few years later Emile Garcke and J. M. Fells in England became much more specific and emphasized an important distinction between so-called "shop expenses" and "establishment expenses."[2] These two classifications followed closely the distinctions which accountants generally make at the present time between "production overhead" and "commercial or selling and administrative overhead." Garcke and Fells also gave income calculation significance to this distinction, as

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[1] Henry Metcalfe, Cost of Manufactures, (New York: John Wiley & Son, First edition, 1885, Third edition, 1900).

[2] Emile Garcke and J. M. Fells, Factory Accounts, (London: Crosby Lockwood and Son, 1893), pp. 71-73.

is a general practice today, by distributing "shop expenses" over tangible goods produced while charging "establishment expenses" directly to revenues of the period in which they were incurred and recorded. One of the reasons which these authors gave for this distinction was based on recognition of a relatively greater tendency for "shop expenses" to vary in proportion to the quantity of goods produced. This certainly strikes a familiar note in terms of current thinking of individuals who champion the "direct costing" approach.

Garcke and Fells' position seems now to be far in advance of the times. This is borne out in part by the lack of an immediate general following by their contemporaries. The terms "shop expenses" and "establishment expenses" were used with various meanings by writers of the 1890's and from 1900 to 1910, but it is not difficult to detect the substance of varying opinions of writers in this area. Most of the authorities of these two decades agreed that the factors which contributed to what is now known as production overhead are different from those causing selling and administration costs and that therefore there was some advantage to a segregation of these two groups of overhead costs.

The authorities of the time were not equally unanimous in their attitudes toward assignments to products. H. M. Norris, for example, insisted that all costs of any nature which are not chargeable to some specific order number should be spread over the products manufactured. [1]

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[1] H. M. Norris, "An Accurate Cost Keeping System," Transactions of the American Society of Mechanical Engineering, Volume XIX, 1898, p. 389.

The eminent A. Hamilton Church, writing in 1901,[1] suggested a concept of production costs which included "prime costs," "shop charges," and "general establishment charges." He gave special emphasis to "shop charges" but felt that "general establishment charges," made up of selling and administrative costs should also be allocated to products. Some nine years later, however, Church reversed his position and subscribed to the exclusionists' proposition.

Many other writers of the early 1900's took sides on this general argument. Pedder, Urie, Arnold, Spencer, and Whitmore, for examples, lined up with the inclusionist group while Halsey, Smith, Nicholson, Bunnell, and in 1910, Church insisted that selling and administrative costs had no place in burden rates used for product costing.

Generally it appears that at the turn of the century the prevailing practice in both England and the United States was to assign substantially all costs to product units and that by 1910 or shortly thereafter practice in England had changed to exclude selling and administrative costs and that there was a tendency in the United States, although with some time lag, in the same direction. Writing in 1911, F. E. Webner insisted upon a distinction between manufacturing and commercial overhead and stated that

> items which pertain purely and simply to the sale of product have no place in the cost of production. This is also true of those other

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[1] A. Hamilton Church, "The Proper Distribution of Establishment Charges," A series of six articles appearing in The Engineering Magazine from July, 1901 to November, 1901.

> commercial expenses which have to do more or less directly with the delivery of the product and with collections, such as cash and quantity discounts, crating, hauling, freight on outgoing products, allowances after product has left the factory, etc. Such expenses are a proper charge, direct and indirect, to loss and gain, but not through production, and any attempt to fasten them on production will be a purely arbitrary process, entirely without advantage and entirely destructive of accurate costs. [1]

C. H. Scovell and Jordan and Harris reiterated this position in 1916 and 1920, respectively, in works which at that time represented comprehensive treatments of the subject. [2]

Although there are a few notable exceptions, some of which are mentioned later in this work, accounting practice and literature since 1920 in this country have condoned the assignment of only production-connected overheads to products. In fact, as is mentioned later, the current trend seems to be toward added exclusion of costs from products rather than a return to the inclusionists' line of thought. Also the distinction between costs assigned to products and those charged to current revenues has been emphasized by the use of decisive classifications such as "product costs" and "period costs."

Early literature is not very explicit as to exact content of production costs on the one hand and commercial costs on the other hand.

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[1] Frank E. Webner, Factory Costs, (New York: The Ronald Press Company, 1911), p. 143.

[2] C. H. Scovell, Cost Accounting and Burden Application, (New York: D. Appleton and Company, 1916), and J. P. Jordan and Gould L. Harris, Cost Accounting Principles and Practice, (New York: The Ronald Company, 1920).

Most writers were content to mention a few rather obvious examples and not to treat borderline cases.

It would surely be remiss to fail to mention the torrent of debate among accountants, both oral and written, on the treatment of interest and rent. This was a twofold problem. First was the matter of whether or not imputed interest and rent--interest on funds utilized and rent on buildings owned and utilized even though no amounts were either paid or payable--should be recorded in the accounting records, and second was the question of whether or not such charges, if recorded, should be assigned to products. This argument pervaded the accounting scene from 1900 to almost 1930 with noted authorities such as A. Hamilton Church and C. H. Scovell taking stands in favor of inclusion of these items, especially interest, as costs of production. The basis for such argument was primarily in terms of the importance of segregation of interest from profits in the sense utilized by most economists of that day and even of today. This enthusiasm has waned since 1930 and one finds only little favor for Scovell's position at this time. Yet Garner suggests that "it seems only to be smoldering, awaiting perhaps a re-crudescence."[1]

In the years since 1930, new types of substantial costs have made their appearance on the scene in the fringe area between production and commercial costs. Some examples include packaging and shipping,

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[1]Garner, op. cit., pp. 142-143.

research and development, storage of finished products, and royalties. There appears to be little unanimity as to proper treatment of these items either in theory or in practice.[1]

This discussion has been concerned solely with evolution of ideas and practices related to inclusion of items of "actual" overhead costs as assignments to products. It is of course recognized that with the coming of standard costs the additional problem of dealing with cost variances presents itself. This problem will be treated in a later section.

Techniques of Applying Overhead Costs

The increased awareness of the significance of overhead costs in the latter part of the nineteenth century brought with it concern for techniques for making associations of such costs with product units. Since "prime costs" had been emphasized, the most obvious method, and that first used, was to apply an amount of overhead based on a percentage of total material and labor costs. The prevalence of the use of this method in England probably accounts for the origin of the term "oncost" which still is in use today.

It was not long until weaknesses of this "percentage of prime cost" method were recognized. It became obvious that material costs bore

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[1] In a study made by the National Association of Cost Accountants in 1947 a wide variation of practice in this area was found. Research Series No. 10, "Costs Included in Inventories," Volume XXVIII, No. 24, N. A. C. A. Bulletin, (August 15, 1947).

no necessary relationship to the demands which product manufacture placed upon factory facilities and supervision. Thus overhead application, when practiced, came to favor labor cost alone as the basis upon which a percentage was computed and applied. F. E. Webner suggests that a percentage method based either on labor cost or prime cost was in general use in the early 1920's and that such was the case

> largely due to the fact that, until the earliest improvements of cost finding methods were begun about 1890, no other method was known and manufacturers generally have been loth to turn from their attitude of smug indifference to what was considered a non-essential refinement. [1]

The labor cost basis of spreading overhead over products was also met with considerable criticism. Products upon which expensive labor was applied were loaded more heavily than were those produced by inexpensive labor. Thus in situations where a wide range of labor rates was in effect various products seemed to carry disproportionate shares of overhead costs. Departmental overhead rates tended to minimize this criticism but the basic weakness still remained. Overhead costs were being assigned as a function of cost dollars even though they seemed more reasonably to be a function of production activity, perhaps as measured by labor hours.

Some writers as early as the 1880's suggested the use of a labor hour base for assigning overhead costs, [2] thereby meeting the criticism

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[1] Frank E. Webner, Factory Overhead, (Washington, D. C.: The White Press Company, Inc., 1924), p. 345.

[2] As examples, Metcalfe in the United States and Garcke and Fells in England suggested in the 1880's the possibility of use of labor

leveled at the labor cost base. But this suggestion, although it gained some acceptance, was resisted by those who were impressed with the importance of machinery and equipment in the manufacture of goods. They appropriately noted that products requiring expensive equipment and machinery were loaded no more heavily with overhead costs than those which resulted from mainly manual operations as long as labor hours required were the same.

The next logical development therefore seemed to be to give recognition to equipment and machinery utilized by developing machine or tool rates. Various schemes along this general line were suggested prior to the turn of the century. It was not until 1901, however, that the fundamental idea reached its fruition with A. Hamilton Church's "scientific production center" technique.[1] Church segregated "shop charges" from general shop overhead. He divided the factory into "little shops" or production centers and calculated "scientific machine rates" for loading products passing through the various centers. He then loaded all products with an additional amount for the remaining general shop overhead.

Although adding little from a theoretical or conceptual standpoint, John H. Whitmore, in an article appearing in the Journal of Accountancy

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hours. Metcalfe favored such a method pointing out that overhead costs were more closely related to the time element than to the cost of labor or materials. Metcalfe, op. cit., and Garcke and Fells, op. cit.

[1]Church, op. cit.

in 1906, illustrated in debit and credit terms the means for implementing Church's proposals.[1] This and other writings of Whitmore in the field of accounting for overhead costs were well in advance of most of the thinking of the first decade of the twentieth century.

The allocation of overhead costs continued to be given more and more attention by industrial engineers and accountants but progress was mainly by way of a more general facing up to the problem of assigning of overhead costs and concern for practical implementations of ideas expressed prior to 1910 with only slight refinements. Paul Garner observes the almost innumerable authorities on costing and the large mass of mainly redundant written commentary on overhead costing during the period from 1910 to 1930. He says that after a survey of the material "one is forced to conclude that each speaker or writer felt it essential that he cover the subject as though no one had ever examined it before."[2]

F. E. Webner, in his book entitled Factory Costs,[3] described the various methods of assigning overheads which had previously been suggested and added a couple of relatively insignificant new techniques. He pointed out strong and weak features of each method and indicated

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[1] John H. Whitmore, "Factory Accounting as Applied to Machine Shops," Journal of Accountancy, (November, 1906), pp. 21-31.

[2] Garner, op. cit., p. 181.

[3] Webner, op. cit., pp. 344-370.

circumstances most favorable to the use of each. This work of Webner's, published in 1924, provides a well organized resume of previously expressed theories and observations. At about this time also A. Hamilton Church, C. H. Scovell, and J. M. Clark produced well-known treatises[1] on this and closely allied problems.

It would certainly be incorrect to say that methods of factory overhead assignment have been neglected since 1930, but one can find some change of concern in favor of accounting for administration and distribution costs and their apportionment to product lines and other useful classifications. It seems necessary also to mention an apparent growing concern in the last twenty years for possible over-emphasis of overhead cost assignments to the detriment of significant cost analyses. Although those who in their practice and their writings depart substantially from overhead apportionment do so with a more extensive and sound understanding of potentially useful cost data, one can hardly fail to be reminded of similar convictions of the English author, J. S. Lewis, at about the turn of the century, and of even earlier writers who saw little to be gained by spreading of costs other than those for direct materials and direct labor.

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[1] A. Hamilton Church, Manufacturing Costs and Accounts, (New York: McGraw-Hill Book Company, Inc., First Edition, 1917 and Second Edition, 1929) and Overhead Expense, (New York: McGraw-Hill Book Company, Inc., 1930). C. H. Scovell, op. cit. John Maurice Clark, Studies in the Economics of Overhead Costs, (Chicago: University of Chicago Press, 1923).

Development of Predetermined and Normal Overhead Rates and the Recognition of Fixed and Variable Overhead Costs

Prior to 1885 the problem of handling overhead costs was thought of almost solely in terms of historical costs. As has been mentioned earlier there were several cost authorities who at this time still insisted on prime costing, so that the problems of predetermined rates were not pertinent. As overhead assignments gradually came to be recognized as accepted practice and product cost figures including factory overhead costs began to be used for pricing products, weaknesses of historical overheads became obvious. Product pricing decisions could hardly wait until the end of an accounting period at which time actual overhead costs could be calculated and spread over products. This disadvantage was recognized, but not expanded upon, by Garcke and Fells, and G. P. Norton in the late 1880's in England. Henry Metcalfe, in 1885, in this country, suggested that since overhead items were not known exactly until the end of a year it was logical to assume relatively little variation from year to year and thus to load production with an amount determined by use of a rate based on the past year or several years' experience.[1]

In Britain F. G. Burton pointed out in the 1890's that in estimating the overhead element of a job a percentage of wages on jobs expected during the ensuing six-months' period should be determined. He recognized that if few jobs were expected the rate would be high and if many

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[1] Metcalfe, op. cit., p. 166.

jobs were expected the rate would be low. He thus was aware of fixed tendencies of overhead costs. He was also concerned with problems of making competitive bids for jobs when production was low and predetermined rates were high. Although Burton suggested a six-months' period of normalizing of overhead costs for bidding purposes he was not so disposed towards the procedure for his "cost accounts." In this connection he stated in a work of a few years later that

> costing should be completed . . . to the close of each month, as longer periods would involve much complication, and it is essential for correct results that the establishment charges for any one month are distributed over the direct wages for that month, and over no other. [1]

At about the turn of the century predetermined overhead rates and problems of idle time began to be given more consideration, especially in this country. The rapid growth of industries and more extensive tapping of our natural resources during the early years of the twentieth century with a greatly increased production of economic goods brought about an awareness of competition and the need for up-to-date, complete and reliable cost information.

Product costs which fluctuated widely in inverse relationship with production activity seemed inappropriate as a base for selling price determination. The use of predetermined rates based on the previous year's experience attained some favor. Oberlin Smith, for example,

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[1] F. G. Burton, Engineers' and Shipbuilders' Accounts, (London: Gee & Co., 1902), p. 92. "The Accountants' Library" Volume XIV.

in 1897, stated that the "theoretical way" to determine an "expense" rate was to take last year's rate, adjust it in the light of actual expenditures during that year, and use this figure for the current year.[1]

Some authorities of the latter part of the nineteenth century became concerned with the problem of idle time costs. The concern did not however lead to any significant suggestions for solution to the problem until in 1901, when A. Hamilton Church published his well-known work[2] in which he recommended the use of "scientific" machine hour or production center rates based on capacity levels of production. By this method costs of idle facilities were allowed to remain for a secondary distribution by use of what he called a "supplementary rate." Although Church's technique of assignment of overhead costs was later roundly criticized, he had demonstrated a good grasp of the problem of fixed costs and their relationship to production. His concept of normal overhead rates based on practical capacities of all "little shops" or production centers of a factory has become a recognized useful concept of modern industry.

Church's famous series of articles of the early 1900's paved the way for other proposals directed at the problems of stability of

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[1] Oberlin Smith, Transactions of the American Society of Mechanical Engineers, Volume XVIII, 1897, p. 893.

[2] A. Hamilton Church, "The Proper Distribution of Establishment Charges," Article III, "The Scientific Machine Rate and the Supplementary Rate," The Engineering Magazine, Volume 21, p. 904.

overhead rates and the handling of idle time costs. David Cowan, in England, wanted to extend the time period over which rates were determined to a "cumulative average" of past years, covering what he called a "trade cycle."[1] With the custom of yearly reporting already established he had to deal with year-end over- or underabsorptions. He suggested the use of compensating or suspense accounts. But for the most part his costing procedures were not integrated with the formal accounts, and thus his treatment is not clear in terms of modern day techniques.

H. S. Garry, also in England, referred to idle time costs as a "dead charge"[2] and, although he did not make it entirely clear, it appears that he thought of this charge as a sort of waste rather than as a cost of products.

In the United States, cost authorities discussed and expanded upon Church's views. In 1906, John Whitmore suggested the use of a ledger account entitled "factory capacity idle" to which unabsorbed production overheads should be charged.[3] He felt as did Church that such costs should be absorbed into cost of product, but he emphasized the importance of keeping the idle facility costs segregated from those costs

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[1]David Cowan, "Administration of Workshops," The Accountant, (November 16, 1901), Volume 27, p. 1252.

[2]H. Stanley Garry, "Factory Costs," The Accountant, July 25, 1903, Volume 29, p. 957.

[3]Whitmore, op. cit., p. 31.

applied by use of the regular overhead rates. He also saw some danger in an assumption of an ideally high level of machine usage and suggested a concept of normal usage rather than capacity potential.

As might be expected there were outspoken critics of rate predetermination during the early years of the 1900's. It was insisted by some authorities, especially in England, that although estimated rates might find some usefulness in estimating, nothing would suffice in the formal cost records except actual costs to be determined only at the end of the accounting period.

By 1910, Church appears to have changed his views somewhat with regard to treatment of idle time costs. He recognized the arbitrary nature of his supplementary rate and emphasized that it was an estimate of the ratio of wasted capacity to utilized capacity. He intimated that perhaps the cost of wasted capacity should not be considered a cost (cost of product) at all yet he still seemed to favor the spreading of such costs over goods produced.

Agreement was not entirely unanimous, but by 1910 most authorities in the United States favored the use of predetermined overhead rates based upon a time period of at least a year. The manner of handling idle time costs however was given added importance during the depression pre-war years of 1913 and 1914 and controversies in this area continued with increased vigor. In 1914, C. H. Scovell wrote as follows:

> The burden on idle machinery is no more a part of the cost of manufacture (unless due to enforced seasonal variations) than the

> burden on a shop owned by another corporation. When there is a proper distribution and application of expense burden only the burden is charged to cost which represents the equipment utilized in manufacture, and burden not applied remains as a balance to be charged direct to the loss and gain account at the end of the month, six months, or a year. [1]

F. E. Webner, on the other hand, in his Factory Costs, [2] worked out a system using reserve account balances which made possible complete absorption of production overhead costs by products.

The treatment of idle time costs as a loss gained ground. In another major work, Church tended to lean more and more away from the use of his supplementary rate technique. [3] The controversy continued throughout the twenties until finally in 1930, Church in his Overhead Expense went along with the others in charging idle time costs to revenues of the current period. [4]

The concern for idle time costs throughout the period of some forty years from 1890 to 1930, as has been mentioned, reflected a consciousness of the fixed nature of certain overhead costs and to some extent an awareness of general cost behaviors. There was however

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[1] C. H. Scovell, "Cost Accounting Practice with Special Reference to Machine Hour Rate," Journal of Accountancy, (January, 1914), pp. 21-22.

[2] Frank E. Webner, Factory Costs, (New York: The Ronald Press Company, 1911).

[3] A. Hamilton Church, Manufacturing Costs and Accounts, (McGraw-Hill Book Company, Inc., Second Edition, 1929), p. 387.

[4] A. Hamilton Church, Overhead Expense, (New York: McGraw-Hill Book Company, Inc., 1930).

little said specifically about account segregation of fixed, semi-fixed, and variable costs, and overhead rates were seldom devised separately for fixed and variable items. Predetermined rates became accepted procedure mainly as a practical means of producing current cost information. They served to normalize or average out short period fluctuations and, as sometimes devised, to segregate so-called costs of idleness. Product costing during this period seemed in most cases to be argued on "all-purpose" grounds with concern for "correct" as opposed to "incorrect" costs. With one major exception--the work of J. M. Clark in the 1920's, [1] -- the recognition of special product costs for varied purposes was not emphasized.

Accounting literature over the past twenty-five years reflects a growing interest in overhead cost behavior and the resultant effects upon product costs. Predetermined overhead rates are taken almost for granted. Significant evolutionary developments have been based upon an increased concern for the social and economic significance of costing. This, coupled with an ever-increasing effort to provide information useful for the profitable operation of the individual firm, has brought about a recognition of the existence of special product overhead cost concepts for special purposes. The refinement of such a variety of concepts appears to provide an area for much potentially fruitful study.

Standard Overheads

The transition from early concepts of predetermined overheads

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[1] Clark, op. cit.

to the later concepts of standard overheads has been gradual, and steps in the development are difficult to delineate accurately because of the wide range of practice at any one time. Many situations existing today could be cited to show overhead costing of the variety proposed as early as 1910, when the primary, if not sole purpose, of use of predetermined rates was to get product cost information before the end of the accounting period. The strong movement toward standard costs as opposed to actual costs in the past forty years has, however, had its effect upon overhead costing.

There were during the early years of this century two rather different types of emphasis given to the growing enthusiasm for predetermined or standard costs. Some writers seemed to be concerned mainly with "true costs" for inventory valuation purposes and others were impressed with the managerial tool afforded by a comparison of "actual costs" with "standard costs."

Although it was not so considered when presented, the use of capacity machine rates as proposed by Church in 1901 paved the way for development of concepts of standard overhead costs of products. Church was not willing at that time to consider only the overhead absorbed by his "scientific machine rates" based on capacity operations as product costs. He did nevertheless emphasize a residual amount of overhead which he suggested should be assigned using a "supplementary rate." This residual soon was questioned as a part of "true product

cost" and it was insisted that it represented "cost of idle time" and should be divorced from product cost calculations.

If costs of unused facilities were not costs of products, perhaps other costs related to production effort could not be justified as such. In 1908, one finds John Whitmore suggesting that "true or correct cost does not necessarily include every expense incurred in the course of producing an article."[1] In the same year Harrington Emerson extended this line of thinking in a series of articles published in the Engineering Magazine. In a volume published in 1909, Emerson states that

> there are two radically different methods of ascertaining costs: the first method, to ascertain them after the work is completed; the second method, to ascertain them before the work is undertaken. . . . The objections to the old method are not only that it delays information until little value is left in it, but that it is wholly and absolutely incorrect, mixing up with costs incidents that do not have the remotest direct connection with them. . . . The advantages of the second method are not only that costs must be ascertained before the work is begun, but that the costs as finally tabulated are the real costs."[2]

Thus "true product costs" became a matter of predetermination. In terms of production overhead, many if not most authorities were insisting by 1930 that only precalculated standards or budgeted amounts per unit could be reasonably associated with products and that these amounts should reflect an acceptable level of efficiency and a volume dictated by capacity in terms of existing physical facilities.

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[1] John Whitmore, "Shoe Factory Cost Accounts," Journal of Accounting, (May, 1908), p. 14.

[2] Harrington Emerson, Efficiency as a Basis for Operation and Wages, (New York: The Engineering Magazine Co., 1919), pp. 149-150.

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Church, in emphasizing a residual to be distributed by use of a "supplementary rate," had stressed the significance of the amount as an index of utilization of plant facilities and thus had also introduced the concern for managerial usefulness of cost information. With this basic idea introduced it was only a slight additional step to consider other costs which might, if divorced from product assignments, provide useful indicators of productive effectiveness.

Although not primarily concerned with the accounting aspects of the use of standard costs, F. W. Taylor gave substantial impetus to this line of thinking as a result of his studies of scientific management in the early 1900's. It is in his works that one finds perhaps the first reference to "management by exception."[1] Emerson, in 1909, provided a degree of definiteness to this idea by giving a clear, although not detailed, account of standard costing.[2] He was obsessed with the revolutionary possibilities of changing from the old method of determining costs to the new use of standardized costs. He provided many examples of possibilities for almost phenomenal increases in production resulting from a psychological awareness of precalculated costs. He states that

> the old method was to call out the priests and tom-toms when an eclipse was occurring and thus drive away the devil who was eating

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[1] F. W. Taylor, "Shop Management," Transactions of the American Society of Mechanical Engineers, Volume XXIV, 1903, p. 1408.

[2] Emerson, op. cit.

> the sun. The modern method is to predict the eclipses decades or centuries in advance, and check up our clocks, watches, and calendars by the actual occurrence. [1]

Emerson did not treat problems of standard overheads separately. Nor did he get into any detail of analyses of variations of actual costs from standards. Nevertheless, his clear presentation of the idea of standard costs and the enthusiasm with which he championed it doubtless quickened the development of the use of predetermined standard overheads.

During the period from 1918 to 1920, G. Charter Harrison wrote a series of articles[2] on the subject of "Cost Accounting to Aid Production" in which he described several standard cost plans. The idea of standard costs was advanced still further by J. Lee Nicholson, the organizer of the National Association of Cost Accountants. The first yearbook of this organization in 1920 shows clearly that members of the group were thinking seriously of the subject of standard costs and with general favor.

In the past thirty years, standard cost systems have come into general use by medium and large sized business organizations engaged in manufacturing activities. Standard overhead rates are a part of these systems; however, there continues to exist a variety of concepts as to how such rates should be determined and the interpretations to be given the results produced by their use.

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[1] Ibid., p. 150.

[2] G. Charter Harrison, Cost Accounting to Aid Production, (New York: The Engineering Magazine Co., 1921). A revision of a series of articles appearing in Industrial Management between October, 1918 and March, 1920.

CHAPTER III

OVERHEAD COSTING OF PRODUCTS AND ITS RELEVANCE TO INCOME DETERMINATION

Having briefly traced the historical development of associations of overhead costs with product units, the foundation has been formed for an examination of alternative concepts and their propriety for various objectives. In this chapter the significance of overheads and product unit costs is considered as it relates to the work of the public or professional accountant and his primary objective of accurate income determination.

Accountants' Preoccupation with Inventory Valuation and Flow Assumptions

Accounting literature originating from professional accountants is very apt to give readers the impression that the approach to the subject of defining the concept of product costs should be almost exclusively in terms of inventory valuations and inventory pricing methods. Such an approach seems somewhat awkward if not misguided since inventories are usually considerably smaller than the aggregate quantity of products sold or transferred during an accounting period, and since the public accounting profession has during the past ten to twenty years

emphasized income measurement as the primary concern of accounting theory. Yet if the cost of products sold or transferred and the cost of products in inventory are correctly recognized to be similar components of an aggregate amount of goods available for sale or transfer, the approach is of little significance.

Professional accounting literature relative to product costing has also emphasized the problem of selecting an appropriate assumption of sequence or order of movement of items through inventories in order to match realistically revenue and cost dollars. Many illustrations of this may be found.[1]

One must recognize the practical if not theoretical impossibility of associating product costs with identifiable units of an homogeneous bulk of products and therefore must recognize the need for an assumption as to the flow of goods in order to determine inventory valuations and expirations. One must also realize that this problem of assuming a sequence of flow or movement is applicable to both merchandising and manufacturing types of enterprises. Nevertheless, it is difficult to justify the extent of preoccupation of professional accountants in

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[1] In an excellent work by Carl Devine entitled Inventory Valuation and Periodic Income may be found a comprehensive commentary on the use of various flow assumptions, the use of "cost or market, whichever is lower," and other problems of inventory valuation extending over some 12 chapters and 190 pages, with only a portion of two chapters which together total only 23 pages devoted to the problems of determining cost content of manufactured goods inventories. Carl T. Devine, Inventory Valuation and Periodic Income, (New York: The Ronald Press Company, 1942),

favor of this consideration to the exclusion of the problem of content of cost of partially completed goods and finished goods of a manufacturing concern. W. A. Paton has called this to accountants' attention as follows:

> The amount of the periodic inventory may be greatly affected by the general policy adopted with regard to the kinds of classes of costs considered to be inventoriable; the committee on accounting procedure and accountants generally will do well to keep this fact in mind in dealing with those phases of the inventory problem which have been most actively discussed in recent years. To spar endlessly over pricing alternatives which involve, say, 10 per cent variation in total, and entirely ignore an area of policy which may easily mean a variation of 50 per cent in the final determination, smacks of the lack of sense of proportion of which auditors have often been accused. [1]

Although inflationary tendencies during the years which followed this statement have doubtless increased the 10 per cent approximation of possible variation due to pricing alternatives, this observation remains basically correct today. Accountants are still sparring over pricing alternatives and somewhat naively accepting a wide range of practice with regard to inventoriable or non-inventoriable costs. In fact Mr. Paton reiterates this thesis some eleven years later, when he points out that accountants have been preoccupied with the problem of how the flow of cost factors is to be measured without giving much consideration to the question of the kinds of costs to be included. He submits that

> the way in which factory overhead is defined, for example, may have a greater influence on the final inventory figure than the

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[1] W. A. Paton, "The Cost Approach to Inventories," The Journal of Accountancy, (October, 1941), p. 300.

adoption of the weighted-average method of computing the amount of materials issued instead of first-in, first-out procedure. [1]

If one is to take first things first, he must determine the number of cost dollars to associate with physical goods before concerning himself with the making of an assumption of identity of items on hand as opposed to those released, transferred, or sold. He must also determine costs in terms of original vintage dollars before having a suitable basis for considering techniques for conversion to more nearly current vintage dollars.

Considerations of this paper are not with product flow assumptions or the segregation of costs of products remaining in inventory as opposed to the cost of products which are severed from inventory, but rather with the association or disassociation of indirect costs with products resulting from manufacturing activities, recognizing the resulting direct effects upon inventory valuations and computed net income and the managerial uses of product cost information.

Inconsistency and Variability of Overhead and Product Cost Concepts

Before embarking upon an examination of a theoretical framework for use in establishing a suitable product cost concept it is perhaps

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[1] W. A. Paton assisted by W. A. Paton, Jr., Asset Accounting, (New York: The MacMillan Company, 1952), pp. 54 and 55.

appropriate to review in somewhat more detail than has already been done the apparent attitudes of individual accountants with regard to the matter. Doubtless the most authoritative body of professional accounting literature is to be found in the Accounting Research Bulletins issued by the Committee on Accounting Procedure of the American Institute of Accountants. After stating that "the primary basis of accounting for inventories is cost," the Committee suggests that cost as applied to inventories

> means in principle the sum of the applicable expenditures and charges directly or indirectly incurred in bringing an article to its existing condition and location. [1]

Recognizing some of the problems of application of the cost principle to inventories the Committee states that

> the exclusion of all overheads from inventory costs does not constitute an accepted accounting procedure. The exercise of judgment in an individual situation involves a consideration of the adequacy of the procedures of the cost accounting system in use, the soundness of the principles thereof, and their consistent application. [2]

These statements obviously fall short of offering any hope of a degree of uniformity in the assignment of overheads to products. The Committee has indicated that which is not acceptable, but it has not indicated that which is acceptable.

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[1] Committee on Accounting Procedure, American Institute of Accountants, Restatement and Revision of Accounting Research Bulletins, (New York: American Institute of Accountants, 1953), p. 28.

[2] Committee on Accounting Procedure, American Institute of Accountants, op. cit., p. 29.

Since there are so many possible concepts of the appropriate amount of overhead to include in inventories such an approach is nearly useless. Although recognition of the need for exercising judgment is commendable in this situation as it is in all accounting and other types of problems, this latter statement does little more than to implore the accountant to uphold acceptable methods and to abhor the unacceptable, whatever they may be. Perhaps it does serve to dodge the issue by passing the decision on to the cost accountant by reference to the soundness of principles involved in the cost accounting system in use. This statement may, however, be deemed to imply that the objectives of costing are universally the same and that product cost concepts suitable for use by the cost accountant and in the day-to-day record keeping procedures must necessarily suffice for income determination and inventory valuation for all purposes. As has already been mentioned and as will be developed further later such an assumption is wholly unreasonable. Accountants may recognize several useful concepts of product costs as they relate to overheads and yet be quite aware of the importance of rather definite concepts for definite purposes.

Yet this indecisive and middle-ground position of the Committee's statements becomes somewhat understandable if not justifiable when one notes the wide range of attitudes on the subject indicated in writings of members of the accounting profession. After referring to direct costing as a method by which only material, labor, and variable

production overhead costs are associated with units of product, Robert Beyer states that "direct costing should not be used in financial statements, even for interim statement purposes."[1] Taking a diametrically opposite stand, Lawrence and Humphries explain their position in disturbingly dogmatic terms by stating that "from every point of view the Marginal or Direct Cost is the only value that can be justified for the valuation of Stock and Work in Process."[2] By Marginal or Direct Cost these writers mean production costs which tend to vary in direct proportion to production levels.

John A. Beckett, in taking a look at direct costing, suggests that the advantages of direct costing for profit measurement purposes are several, but that it is in the area of accounting theory and philosophy that direct costing does violence to traditional accounting thinking. He submits that there are two diversely opposed philosophical schools of thought with regard to whether or not fixed costs are actually product costs. He disassociates himself from either of these groups by insisting that

> it is impossible to solve the question of inventory valuation satisfactorily once and for all on philosophic grounds and that the crux of the matter is to be found in the purpose for which the resulting information is to be used.[3]

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[1] Robert Beyer, "Is Direct Costing the Answer?" The Journal of Accountancy, (April, 1955), p. 48.

[2] F. C. Lawrence, and E. N. Humphreys, Marginal Costing, (London: MacDonald and Evans, 1947), p. 47.

[3] John A. Beckett, "Direct Costing in Perspective," N. A. C. A. Bulletin, (January, 1955), p. 651.

Within the limits of so-called absorption costing whereby at least a portion of fixed overhead is assigned to products one also finds wide diversity. Charles F. Schlatter takes a strong stand in favor of a burden rate based on a high level of activity which he calls practical capacity.[1] By doing so he champions the "theory of unearned burden" which was advocated by Clinton H. Scovell as early as 1920.[2] This approach generally has the effect of assigning only overhead costs which are deemed to be literally effective in the production of goods to products, while costs of idle equipment and other facilities occasioned by low sales volume and thus low production are never associated with products.

John Neuner provides an example of another approach to the problem. He recognizes the "practical capacity" approach but suggests that "a more reasonable interpretation . . . assumes production at the expected actual volume for a period of a year or less," and thus that "the sales budget is usually the determining factor."[3]

Then the Machinery and Allied Products Institute strikes the apparently inevitable compromise. Writing for its members in a practical setting the Institute, after explaining the need for a concept of "normal activity level" states that such a level "should be established

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[1]Charles F. Schlatter, Cost Accounting, (New York: John Wiley and Sons, Inc., 1947), Chapters XV and XVI.

[2]Clinton H. Scovell, Cost Accounting and Burden Application, (New York: D. Appleton and Company, 1920), Chapter XII.

[3]John Neuner, Cost Accounting, (Homewood, Illinois: Richard D. Irwin, Inc., 1952), p. 226.

at a point which represents a reasonable balance between the probability of selling its output and its capacity to produce."[1] One is left to wonder whether this reasonable balance is the half-way point or, if not, just where it is.

In addition to this wide range of suggested practice there remains still the problem of the use of "actuals" as opposed to budgeted overhead costs. Enthusiastic proponents of the use of standard costs in the formal accounts usually insist that only the standard or budgeted amount of factory overhead should be considered as a potential inventoriable cost while excesses over such budgeted amounts are losses which must be recognized in the period of incurrence.[2] Many accountants, on the other hand, strongly insist that budgeted overhead costs may replace "actuals" only if they deviate by an amount deemed to be immaterial. In other words, they insist on "actuals" as the ideal against which acceptability of other concepts should be measured.

Although Accounting writers are not always careful to make it clear that their concern for possible applications of overhead costs to product units relates only to production or factory overhead, this is

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[1] Machinery and Allied Products Institute, MAPI Accounting Manual, (Chicago: Machinery and Allied Products Institute, 1952), p. 410.

[2] An example of this contention which is often repeated in current writings of industrial accountants is found earlier in writings of Hamilton Church. See Church's Overhead Expense, (New York: McGraw-Hill Book Company, Inc., 1930), p. 90.

usually implied in their discussions, since exclusion of so-called selling and administration costs from inventories has become generally accepted and expected accounting procedure. However, Donald M. Russell suggests

> it may be that . . . a substantial portion of the expenditures classified in financial accounting as selling, advertising, administrative and general expense can be logically tied on to the product or service.[1]

Without using the terms "selling" or "administration" W. A. Paton wrote in a similar vein and suggested some fifteen years ago that

> we are beginning to realize that accounting is concerned primarily with economic rather than the physical aspects of business activity, and that any and every cost factor which economically is necessary to the result--which must be incurred if activity is to continue--is a valid and significant element in the total cost accumulation and hence may properly be taken into account in the measurement of the cost of inventory at any particular moment.[2]

Yet Carl Devine suggests a cautious generalization that in determining costs to include in the inventory group accountants generally

> would emphasize the distinction between costs directly associated with the shaping of the physical commodity and those connected with selling and strictly administrative activities.[3]

These statements make it obvious that it is impossible to indicate

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[1]Donald M. Russell, "Applications of Generally Accepted Accounting Principles to Cost Accounting," N. A. C. A. Bulletin, (August 15, 1948), p. 1542.

[2]W. A. Paton, "The Cost Approach to Inventories," The Journal of Accountancy, (October, 1941), p. 300.

[3]Carl T. Devine, Inventory Valuation and Periodic Income, (New York: The Ronald Press Company, 1942), p. 18.

in exact terms the position of the accounting profession with regard to inventoriable overhead costs. An attempt at summarization and generalization may however be made.

Indirect costs which are closely allied to or show an affinity to production activities and are therefore categorized as production overhead enjoy a degree of sanctity as inventoriable costs in accounting practice and in much accounting literature. Yet there are exceptions. Costs of idle facilities, for example, have long been considered questionable charges to product units and more recently a substantial group of accountants, especially cost accountants, have insisted that all production overhead costs which tend to remain unchanged in spite of fluctuations of production levels should be considered as expenses at the time of first recording and thus should by-pass all product unit valuations. Selling and administration costs are generally assumed to expire at the moment of their incurrence and are therefore not inventoriable. In fact, as a practical matter, many professional accountants would doubtless consider it near heresy to suggest any other treatment.[1] Still, writers in the field of accounting theory continue to recognize some logic to the association of selling and administration costs with

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[1] The Committee on Accounting Procedure of the American Institute of Accountants states that "general and administrative expenses should be included as period charges, except for the portion of such expenses that may be clearly related to production. . . . Selling expenses constitute no part of inventory costs." Restatement and Revision of Accounting Research Bulletins, Accounting Research Bulletin No. 43, p. 29.

product units and many industrial enterprises follow a procedure of assigning, perhaps informally outside of the ledger accounts, prorations of these costs to products.

This wide range of thinking and practice in the area of determination of product costs provides cause for misgivings as to the potential fruitfulness of tussling with the problem. Indeed, some accountants would suggest that the propriety of associating overhead costs with product units for financial reporting may be determined only after a review of the precise circumstances at hand. Still it can hardly be refuted that the widening of stock ownership and the attending public interest in the accountant's analysis of the progress and well-being of individual business enterprises and relative financial success of various enterprises give added emphasis to the need for uniformity of accounting practice in all areas where such uniformity does not violate sound judgment. [1]

Income Determination--a Primary Problem of Professional Accountants

A primary, if not the most important, function of the professional accountant is the determination of income. A report of a recent study

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[1] The Study Group on Business Income has stated that "there have been, and should continue to be, systematic efforts to attain a closer approach to uniformity in the treatment of routine transactions and to eliminate variations in practice which do not reflect material differences in postulates or conditions." Changing Concepts of Business Income, (New York: The MacMillan Company, 1952), p. 107.

on business income included the following statement:

> A fair determination of income for successive accounting periods is the most important single purpose of the general accounting reports of a corporation.[1]

Much has been written by accountants and economists concerning appropriate concepts of net income and accountants have given a great amount of consideration to a variety of techniques by which such concepts may be quantified.

Integrated double entry accounting systems and the attending relationship between accepted concepts of net income and net worth restrict the degree of flexibility in developing separate product cost concepts for income determination and for inventory valuation. Yet it may be helpful to consider these two problems separately. The determination of income is first to be considered. A brief treatment of inventory valuation apart from income determination is included in Chapter IV.

Net Income--an All-purpose or Special-purpose Concept

A substantial group of accountants and some economists insist that the technique of determining net income is and should be dependent upon the purposes for which the resultant is to be used.[2] Proponents of this school point out, for example, that net income upon which an

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[1] Ibid., p. 19.

[2] For an example see Sidney S. Alexander, "Income Measurement in a Dynamic Economy," Five Monographs on Business Income, Study Group on Business Income of the American Institute of Accountants, (New York, 1950), pp. 1-97.

income tax may reasonably and equitably be assessed is a manifestly different concept from that to be used as an indicator of the legality or propriety of dividend declarations and payments or as a test of reasonableness of prices charged for the firm's products or services. On the other hand, the quest for an all-purpose concept of net income which will serve satisfactorily many and varied needs continues relatively unabated. It is therefore necessary to make clear the basic objective of income determination for the purpose of this exploration.

With due regard for the many somewhat special purposes to which the net income resultant is to be put it seems most basic nevertheless that the net income computation which is made public information by inclusion in corporate reports should represent a statistical estimate of the economic progress of the entity over a particular time period.[1] The quantum when considered in the light of existing economic conditions relating to the entity should be significant in the evaluation of effectiveness of management effort for the time period. It should also be readily and appropriately comparable with related estimates for other time periods for the same entity and with corresponding time periods for other entities. It is to these ends that concepts of product costs and their effects upon income determination are here directed.

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[1] An excellent discussion of varied objectives of income determination and the so-called all-purpose concept of business income is to be found in a paper by Charles E. Johnson, The Accounting Review, (April, 1954), p. 224.

Income Determination—a Matching Process

A statistical calculation of economic progress of an enterprise over a specified period of time involves an appraisal of relative economic positions at the beginning and end of such a time span. In earlier days this time period was considered to be the complete life span of a business venture. Today, however, accountants are concerned with the assessment of the results of activities for relatively short periods in the life of a continuing enterprise. This change has brought about an awareness of the ambiguities and subjective estimates attending the valuation process under such circumstances. This and the significance of the lack of measurable market criteria have brought about a change of approach, to which most accountants subscribe, in favor of a calculation which relates measurable economic advantages gained (revenues) with measurable economic sacrifices (cost expirations), most of which are made in the effort to gain such advantages. One writer has referred to these two components of income measurement as "favorable" and "adverse" events.[1] Another author prefers to use even more general terms and speaks of "profits" as the difference between identifiable value of current output and identifiable value of current inputs.[2] In any

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[1] John B. Canning, The Economics of Accountancy, (New York: The Ronald Press Company, 1929), p. 120.

[2] Edgar O. Edwards, "Depreciation Policy under Changing Price Levels," The Accounting Review, (April, 1954), p. 268.

case the accountant's approach to the problem has appropriately changed to one of offsetting or matching of costs and revenues based upon the "going concern" or permanence postulate. This is undoubtedly the most basic idea to which accountants cling in their efforts to quantify periodic business income.

This change of approach accounts for one of the major distinctions between the accountant's measure of net income and that of the economist. The economist's concept of net income as the change in the recipient's entire command over goods and services over a given period is replaced by a concept which singles out certain transactions and confines attention to the effects of these transactions in the measurement of net income. The economist's concept is a more nearly pure and basic idea, but accountants have not found it usable except as a concept from which departures may be measured. Sidney S. Alexander has emphasized clearly the departure which accountants have made and the need for a recognition of the basic economic concept of income. He states:

> The accountant's basic concept of income is similar to the economist's. A year's income is the amount of wealth that could be distributed to the owners of equity over the year and still leave equity at year's end equal to equity at year-beginning. But this basic concept lies so far behind the accountant's operations that it is frequently lost from sight. More immediately there is substituted another concept of income which is equivalent to the economic concept only under highly special circumstances. Instead of basing income on the difference in the value of assets, accountants usually base it on matching costs and revenues. [1]

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[1] Sidney S. Alexander, "Income Measurement in a Dynamic Economy," Five Monographs on Business Income, (New York: Study

Implementing the Matching Concept

Implementing the matching concept requires the determination of the discrete event in the business process which provides the most reasonable signal for recognition of income. Should periodic output, interpreted broadly, be quantified and imputs related thereto, or should inputs be measured as the primary determinant of activity against which output may be related?

Conceptually the answer is of little significance. Results produced by these alternative methods would not differ if periodic inputs and periodic outputs were readily determinable and subject to objective measurement. There would, in fact, be no matching involved since outputs and inputs could each be measured accurately and objectively, completely independent of the other. Neither outputs nor inputs can, however, be determined and measured unequivocally for the short time segments used for income reporting. The accountant must, therefore, choose between inputs and outputs as the primary signal for income recognition.

Broadly conceived, current inputs are perhaps more determinable than current outputs. The measurement of inputs may rely, at least to some extent, upon market criteria provided by costs incurred, whereas sizeable portions of current production (outputs) are not tested by market criteria in the form of sales transactions in the period in which production takes place.

Group on Business Income of the American Institute of Accountants, 1950), p. 35.

If input measurements are used as the signal for recognition of income certain problems are presented. Stored-up services in the form of tangible fixed assets and other prepayments cause difficulties. Also the problem of matching outputs prior to their being tested by the market place is crucial and vulnerable to intentional or unintentional misrepresentation.

Costs incurred (inputs) are considered to be the signal for recognition of income, nevertheless, and with convincing justification, for certain types of operations. When long-term contracts are involved or when market information is available, at least in part, by binding arrangements with customers, the method is often used.[1] It is interesting to note that in these cases the problem of product costing is not relevant to the calculation of periodic income.

The accounting profession has generally departed from a literal attempt to relate total current outputs and total current inputs mainly in deference to the subjectivity attending output measurement devoid of objective market criteria. The departure involves the use of a crude measure of output as the signal for income recognition. It has taken the form of a generally accepted fiction or postulate of realization. This recognized fiction may be stated as follows: "The entire income from sale arises at the moment when realization is deemed to take

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[1] Committee on Accounting Procedure, American Institute of Accountants, Long-term Construction-type Contracts, Research Bulletin No. 45, American Institute of Accountants, (October, 1955).

place."[1] This postulate or rule has been made more specific by practice so that for most situations realization is deemed to take place when a sale transaction has been consummated and the tangible goods delivered or services rendered.[2] This means that output for a time period is measured only in terms of sales transactions. This approximation is deemed to be a suitable approach to that which a more literal interpretation of the output concept would dictate.

The general adoption of the realization idea logically embodies the use of this method of measuring output as the event which initiates the matching process which is basic to the accountant's determination of net income.[3] The next problem is to find ways of matching inputs with outputs thus recognized. Since the timing of output recognition is postponed until the sales transaction has been completed or until

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[1]Study Group on Business Income, Changing Concepts of Business Income, (New York: The MacMillan Company, 1952), p. 20.

[2]The main departures from the practice of revenue recognition based upon the sales transaction are to be found in cases of long-term projects as explained in Accounting Research Bulletin Number 45 of the Committee on Accounting Procedure of the American Institute of Accountants and installment sales where recognition is sometimes postponed until cash collections are made.

[3]A. C. Littleton states that the word "matching" in connection with income determination, "means associating revenue credits and their proper charges; it means associating revenue charges and their proper credits." Further he suggests that "revenue is more often the leading clue to the assignment of applicable costs, expenses, and losses than the latter are clues to the recognition of revenue." Structure of Accounting Theory, (American Accounting Association, Monograph No. 5, 1953), p. 23 and p. 202.

An interesting and somewhat unusual commentary on the process

realization has taken place, the recognition of inputs must also be postponed in order to facilitate proper associations in the determination of income. Thus the problem of devising a definite concept of product costs presents itself as a crucial issue. By associating certain inputs with tangible product units (product costs) they may be postponed and recognized coincident with the corresponding recognition of outputs.

Income Determination and Product Costs

Accrual accounting as it relates to cost expirations involves the recognition of economic sacrifices of a firm without regard to the incidence of related cash outlays. This means that the accountant must recognize and record the effects of non-cash as well as cash outlays involving interests outside of the enterprise and of internal phenomena which cause the dissipation of economic values previously owned and controlled by the business organization.

The matching process by which periodic income is determined then requires that economic sacrifices be associated with benefits

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of income determination may be found in Chapters V, VI, and VII of Moonitz and Staehlings' Volume I of Accounting--Analysis of its Problems, (Brooklyn: The Foundation Press, Inc.), 1952. These authors emphasize the valuation process in the determination of income and find fault with the matching concept by suggesting that "the idea of matching, in the sense of correctly selecting and relating to any part or all of the value of revenue any part or all of the cost of services used up becomes almost completely untenable. So does the idea that the expression 'matching' implies that recorded costs actually contributed to the emergence of the recorded revenue." pp. 146-147.

(revenues) currently recognized or to be recognized in the future. If cost expirations have created comparable economic values which have not been measured by realization at the end of an accounting period such costs are deferred or postponed for their matching against future revenues. Those expirations, on the other hand, which at the close of an accounting period have had their benefits recognized, or show little likelihood of producing benefits to be given future recognition are matched against realized benefits to determine the economic progress of the firm for the given time interval.

Costs occasioned by the production of tangible products to be sold (manufacturing costs) should, for accounting purposes, be attached to such tangible products.[1] At any given moment these tangible units may be partially completed and on hand (work in process), fully completed and on hand (finished goods), or fully completed and sold (cost of goods sold). Categorizing between products on hand and those sold then becomes a direct partial determinant of calculated periodic income, and the time of the disposition of these physical units of product provides

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[1] This procedure has often been referred to as an application of the convention of transferred values. W. A. Paton has stated that "the value of any commodity, service, or condition, utilized in production, passes over into the object or product for which the original item was expended and attaches to the result, giving it its value." Accounting Theory, (New York: The Ronald Press Company, 1922), pp. 490-491.

This idea is repeated with emphasis by W. A. Paton and A. C. Littleton as follows: "It is a basic concept of accounting that costs can be marshalled into new groups that possess real significance. It is as if costs had a power of cohesion when properly brought into contact." An Introduction to Corporate Accounting Standards, American Accounting Association, Monograph Number 3, 1940, p. 13.

the clue for the timing of the matching process. Product costs provide simply the vehicle by which certain costs are matched against revenues. If a charge is included as a part of product cost it is destined to have its effect upon income in the accounting period in which the product item is sold.[1] If a charge is rather disassociated with products it is destined to be offset against revenues in the period in which it is incurred. Product costing is, therefore, one of the more important tools, but not the only one, usable in effecting a reasonable matching of costs and revenues.

Disposition of Selling and Administration Costs

As has been previously indicated costs of the selling and administrative varieties are, as a practical matter, deemed to expire upon

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[1] It may occur to the reader that if interpreted literally specific identity of individual units of product has been implied. Such identity is of course often impractical if not impossible. It is not within the scope of this work to dwell on various assumptions of product flows. It may suffice to suggest, however, that fictitious flow assumptions have merit primarily as dampeners of the effects of a changing value of the dollar. If for the present purposes the process of income determination is assumed to be restricted by the application of the postulate of a stable monetary unit, it is difficult to refute the theoretical logic of an identifiable unit procedure. As a practical matter it is therefore difficult to refute a product flow assumption which is deemed to be the best approximation of actual product flow or that assumption which yields the closest approximation of the result which would be obtained by an identifiable unit procedure if such a procedure were possible.

The implication that costs attach to individual articles and that therefore disposition of physical product units requires the expiration of a stipulated amount of cost is not beyond criticism, but it is not within the scope of this work to consider this problem further. Interesting comments on this subject may be found in Carl Devine's book Inventory Valuation and Periodic Income, (New York: The Ronald Press Company, 1942), pp. 14-15.

incurrence and are matched against revenues of the current period. Some accountants have, however, suggested that some of these costs may appropriately be associated with products and by such a procedure related in part to revenues of future periods. These suggestions require some exploration.

Business enterprises come into being with the intent on the part of the organizers to create a profitable operation. The making of a profit involves two and only two basic types of activities. First, the organization must avail itself of certain products or services. This requires economic sacrifices. Second, these products or services must be sold. This requires additional economic sacrifices and produces economic rewards. Income determination is a process by which these sacrifices are offset against the rewards, recognizing the time lags between them.[1] If such an offsetting process shows the magnitude of the rewards to exceed the magnitude of the related sacrifices, the business has progressed economically. It has been profitable.

Business operation is therefore a twofold activity of acquiring and selling. If acquisition is by purchase only, the organization is referred to as a trading concern. If acquisition involves both purchasing and conversion as well as selling the business is known as a manufacturing concern. In any event there are always two basic activities.

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[1] W. A. Paton and A. C. Littleton have stated that "the problem of properly matching revenues and costs is primarily one of finding satisfactory bases of association--clues to relationships which unite revenue deductions and revenue." Op. cit., p. 71.

They are both essential to profitable operation. Since the selling activity is the only direct or immediate producer of revenues the sales transaction has become the generally accepted basis for revenue recognition. Acquisition or production activities and the selling activity both involve economic sacrifices directed toward the production of benefits to the firm. One activity should hold no priority over the other when it comes to income determination.

In view of this twofold analysis of business activities it would seem that all cost expirations should for accounting purposes be related to one or the other of these functions; namely, production or selling. Accountants have, however, become accustomed to the use of three general classifications, including a category for administrative costs. These costs, which include such items as executive salaries, office wages, office rent and upkeep, professional services, and the like, have become as necessary to orderly and profitable business activity as those costs which are more obviously required by producing and selling actvities. They represent a sort of general business overhead which is made necessary by the need for over-all supervision, planning, coordination, organization, and financing of producing and selling operations. If there were no practical limits on the cost of record keeping, most if not all of these costs could be reasonably associated with either production or selling.[1] Because of such practical limits they have

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[1]Several accountants have suggested this and recognized its usefulness as a tool for income determination. In this connection, Paton

been allowed to create a separate pigeonhole for themselves for accounting purposes. This has perhaps facilitated cost control by providing separate responsibility centers for budgeting and viewing efficiencies, but since there has been little effort to determine the timing of benefits to be derived from costs placed in such a pigeonhole, it has served to deter refinements of product costing and income determination.

As has been stated previously, the problem of income measurement is one of finding reasonable bases for the association of all costs (economic sacrifices) with identifiable revenues. If, at least conceptually, so-called administrative costs can be absorbed into the categories of production and selling, the problem may be viewed in terms of these two and only these two general groups of costs. For costs associated with production activities, product inventories provide the physical props or hangers for suspension or deferral of those costs applicable to future benefits and the disposition of the product units provides the timing for revenue charges. No such "physical" support is

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and Littleton have stated that "growing recognition of the fact that costs may well be classed in two main pools, production and distribution, into which the costs of general administration can be absorbed upon proper analysis, has been helpful." Ibid., p. 71.

Heckert and Willson recognize the school of thought which feels "that manufacturing and distribution are the two main activities of a producing concern, and that administration is merely facilitative or auxiliary." They suggest that "in determining product costs, as well as other operational or functional costs, there is much to be said in favor of relating the administrative costs to each of these other major functions." J. Brooks Heckert and James D. Willson, Controllership, (New York: The Ronald Press Company, 1952), pp. 183-184.

available for selling or distribution costs. As a partial result, accountants have been unduly reluctant to defer any of these costs even though they may be reasonably associated with benefits to be derived in future periods.

Asset representations need not be based solely on tangible goods or even on legal claims. All assets, with the exception of cash, securities, and receivables represent costs suspended in anticipation of future revenues. They need not have physical substance nor necessarily an immediate sales value. Conservatism may be reflected in the determination of the magnitude of these suspended balances, but it is unreasonable to allow the desire for conservative practice to refute the possibility of their existence.[1]

Circumstances sometimes make a direct association of selling costs with units of product seem logical. For example, if several individuals are employed specifically to promote consumer acceptance of a particular product line it might be suggested that the salaries of these individuals should be assigned to the product in this line so that they would eventually be matched against revenues in the period in which the goods are delivered and revenue is recognized in the amount

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[1] This was recognized and some hopeful indicators were pointed out by Paton and Littleton some fifteen years ago when they suggested that there is "an occasional indication in accounting and business practice of a realization of the inherent propriety of accumulating distribution costs as a form of cost 'inventory' to the extent that the charges involved are clearly incurred on account of future sales rather than on account of current business." Ibid., p. 71.

available for selling or distribution costs. As a partial result, accountants have been unduly reluctant to defer any of these costs even though they may be reasonably associated with benefits to be derived in future periods.

Asset representations need not be based solely on tangible goods - or even on legal claims. All assets, with the exception of cash, securities, and receivables represent costs suspended in anticipation of future revenues. They need not have physical substance nor necessarily an immediate sales value. Conservatism may be reflected in the determination of the magnitude of these suspended balances, but it is unreasonable to allow the desire for conservative practice to refute the possibility of their existence.[1]

Circumstances sometimes make a direct association of selling costs with units of product seem logical. For example, if several individuals are employed specifically to promote consumer acceptance of a particular product line it might be suggested that the salaries of these individuals should be assigned to the product in this line so that they would eventually be matched against revenues in the period in which the goods are delivered and revenue is recognized in the amount

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[1] This was recognized and some hopeful indicators were pointed out by Paton and Littleton some fifteen years ago when they suggested that there is "an occasional indication in accounting and business practice of a realization of the inherent propriety of accumulating distribution costs as a form of cost 'inventory' to the extent that the charges involved are clearly incurred on account of future sales rather than on account of current business." Ibid., p. 71.

of the sale price. This procedure would surely accomplish a correct measurement of net income; yet it may be convincingly argued that such a cost should never be included in inventory and that if the cost is incurred prior to the date of revenue recognition that it should be explained better as deferred or suspended promotional costs. It might indeed become rather awkward to classify such costs as product costs if no physical product has as yet actually come into being. Also it might appear rather unreasonable to capitalize extensive advertising costs as a part of product cost in a period when physical production and physical inventories are low. Yet such advertising costs might be appropriate costs to postpone for matching against future sales of goods not yet produced. The matching of selling costs against periodic revenues seems to be accomplished better without regard to physical inventoriable goods by the use of well-explained deferrals.

The quantifying of deferred selling costs is recognized to represent a very difficult and uncertain undertaking. Bases for reasonable association of selling costs and resultant revenues often are obscure if not nonexistent. Nevertheless accountants should be constantly aware of this area as a potentially fruitful means of sharpening the income computation.[1]

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[1] This reluctance to defer other than obvious production costs is attacked by J. S. Seidman. Using most attractive language he suggests that such deferrals are merely a form of inventory and "would embrace items that belong financially to the past and operationally to the future. Some of that future would be mated to existing physical

It is suggested that a product cost concept for income determination should be limited to so-called production costs. This does not imply that all other costs should be doomed to immediate offset against the revenue stream. It only means that production or manufacturing costs are the only costs which can appropriately use the physical product unit as a support to justify deferral into a future period. These costs and only these costs necessarily yield their results in the period when the resultant products are sold.[1]

Even though all deferrals may, in a sense, be thought of as inventories, accountants, businessmen, and the layman have generally

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inventory; some would be of celibate character awaiting wedlock with future production or operations." J. S. Seidman, "Do We Mistreat Administration Expenses in Inventory?" Journal of Accountancy, (April, 1946), p. 288.

[1] It is interesting to note that the Study Group on Business Income found fault with the "matching" concept of income determination. They suggested that income measurement is only partially a matching process and that it might better be described "as a process of (1) matching product costs against revenues, and (2) allocating other costs to periods." Thus they established two categories of costs; namely, product costs and period costs. "The former are charged as the product is delivered (or the service is rendered), the latter as the period to which they are deemed applicable passes." Op. cit., pp. 28-29. It is difficult to justify this criticism of the "matching" concept and this emphasis upon a segregation of product and period costs for income measurement purposes. Charging costs to revenues in the period in which the product is delivered is just a way of saying that they are charged to the period to which they are deemed applicable. This is the essence of the matching process by which net income is measured.

The Study Group does not explain how period costs are allocated to periods. If, as is surely the case, the allocation of period costs to periods takes cognizance of recognizable relationships between such costs and resultant benefits in the form of revenues, this seems as

come to think of the term "inventories" as referring to something quite tangible. In fact the Committee on Accounting Procedure of the American Institute of Accountants has stated in its Accounting Research Bulletin that "the term inventory is used herein to designate the aggregate of those items of tangible personal property which. . . ."[1] Thus it seems appropriate to rule out of these considerations of product cost concepts those costs incident to the selling function without denying their importance to the refinement of income determination.

Two basic problems remain. Costs with an affinity to production activities must be recognized and classified as at least potential candidates for inclusion as product costs, and then the portion of such costs

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truly a "matching" process as the process of association of product costs with revenues in the period of identifiable product sales transactions. Income measurement, for usual practical purposes, is by nature a period or time interval concept. All costs in the final analysis become period costs in the sense that they are associated with some time period. The significant distinction between so-called "product costs" and "period costs" is that the first group may utilize physical inventory units to justify deferral whereas the second group must rely on other less tangible (but perhaps just as real) justification. As a practical matter the Study Group's emphasis upon this twofold classification of costs is likely to deter rather than foster a review of possible refinements of income measurement through appropriate matching of so-called selling and administrative costs with resultant revenues. Some accountants at least imply strongly that "period costs" to them are by definition chargeable to the current accounting period, thus denying the possibility for other than purely arbitrary matching of costs and revenues. Emphasizing categories of costs in terms of their relationship to the revenue stream can only lead to an unconscious clinging to what may become accounting convention without regard to reason.

[1] Committee on Accounting Procedure, American Institute of Accountants, Restatement and Revision of Accounting Research Bulletins, Accounting Research Bulletin Number 43, American Institute of Accountants, 1953, p. 27.

reasonably assignable to products under various circumstances must be determined. Costs of packaging, shipping, research and development, royalties, and storing of finished products are a few troublesome categories often thought of as borderline items.[1] Practice with regard to these classifications varies greatly. It is not within the scope of this work to survey practices in this regard nor to suggest reasonable classifications of these borderline types of costs. The decision should be made, however, with primary regard for causation and benefit relationships and for the resultant effects upon the periodic income calculation. Consistency from period to period is of course significant and it must be recognized that effects of the decision are magnified if there is substantial lack of balance of production and sales and if the cost under consideration varies through a wide range from period to period.

There still remains the problem of determining the portion of periodic production or manufacturing overhead reasonably assignable to product units, recognizing the resultant matching of costs and revenues and therefore the effect upon the net income computation. This problem is now to be considered.

Various Concepts of Production Overhead Content of Product Costs

Production overhead has often been defined as all production or

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[1] A survey was made by the National Association of Cost Accountants to determine how items such as these are treated in practice and results were published in its "Costs Included in Inventories," Research Series Number 10, N. A. C. A. Bulletin, (August 15, 1947).

manufacturing costs other than direct materials and direct labor. A more direct definition might be that production overhead represents those costs that are incident to the production of physical goods but are not readily assignable or identifiable with specific units of such goods. They represent costs that are definitely connected with production effort but are indirect with regard to specific units or batches of production. Many economists appear to consider only costs which are relatively fixed in absolute amount under the overhead category; however, the approach of the accountant and that used here include all indirect production costs without reference to degree of responsiveness to changes of production or sales volume. Typical of these costs are certain taxes, supplies, indirect labor, supervision, insurance, depreciation, and maintenance.

Accountants have long been concerned with the assignment of overhead costs to units of production. The history of this development has been traced briefly in Chapter II. This evolution has for the most part involved two separate problems; namely, the determination of means by which the assignment is to be made, and the question of whether any or all, or what part, of the production overhead should be assigned. The first of these areas is a technical one which involves recognition of cause and effect relationships. The second is more a conceptual problem. This is the one here to be considered.

At the present time there exists a wide variety of practice in

this area and the effects upon periodic income reporting are manifold. Five possible treatments are to be examined in the following pages in terms of their practical effects on the determination of income. These five concepts do not represent all possibilities, but they include both extremes as well as typical middle ground practices, and each practice is capable of reasonably precise definition. These treatments will be referred to as follows:[1]

(1) Complete absorption costing
(2) Expected or average activity standard costing
(3) Practical capacity standard costing
(4) Direct standard costing
(5) Prime standard costing

These practices are listed generally in a sequence starting with the method which produces the highest product cost and ending with that which produces the lowest product cost. Some accountants might suggest that the methods are listed in accordance with an increasing degree of conservatism.[2]

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[1] These five practices are stated in terms of "costing" methods. This terminology is not intended to imply necessarily record keeping procedures but is used only as a convenient way of explaining concepts of product costs in terms of overhead content.

[2] It is not possible to generalize with regard to degrees of conservatism of methods (1) and (2). If efficiency standards are set at relatively high levels, method (1) will tend to give the higher costs per unit. In periods when production exceeds the expected or average levels, method (1) will tend to give the lower costs per unit. In periods when production falls short of expected or average levels, method (2) will give lower costs per unit. Efficiencies and production levels may change so as to result in complementing or offsetting tendencies.

By complete absorption costing all production overhead is assigned to products produced during the time interval of cost incurrence. This may be accomplished mechanically by use of some sort of normal overhead rate along with a supplementary rate or by the apportionment of overhead variances between inventory and cost of goods sold, recognizing identity of units produced and the timing of production. The main characteristics of this practice are first; that it completely absorbs production overhead leaving no variations due either to excessive costs or low volume, and second; that costs per unit of product fluctuate in direct relationship to actual variable costs per unit and in inverse relationship to periodic production levels. Changes of production level will usually cause a greater fluctuation of unit costs than will be caused by variable cost changes. The degree of the effect of production levels is dependent upon the portion of total overhead represented by fixed costs. The greater the proportion of fixed costs, the greater the variability and vice versa.

Procedures (2) and (3) are versions of so-called normal overhead absorption. Method (2) is similar to method (1). It does, however, rely completely upon the ability of management to predict actual production levels whereas method (1) is not so dependent. It also replaces "actuals" with standards or normals. In some instances activity levels are predicted for each year or six-months' interval and the result differs from that produced by complete absorption costing almost

exclusively to the extent by which "actuals" differ from budgeted overhead. In other situations average activity levels for intervals as long as several years are estimated, or the average level for the past several years is used to determine overhead rates. In these situations product costs are "normalized" over an extended period. This latter practice may overabsorb or underabsorb production overhead for individual years or accounting periods thus leaving volume variances requiring explanation. When predicted levels of production change frequently, product unit costs change accordingly, thus yielding results similar to those produced by the first method.[1]

By the practical capacity standard costing method production overhead is assigned to products by use of a rate based on a practical capacity level of operation. Practical capacity is determined by scaling down the theoretical maximum production based upon existing plant and equipment by reasonable allowances for lost time due to inevitable production delays, but without regard for sales potential and production needs. By using this activity level in the determination of overhead rates it is claimed that only effective plant costs are assinged to

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[1] In discussing both the second and third methods it is assumed that overhead variances are charged to revenues of the period in which they appear and are never associated in any way with product units. If it were assumed otherwise, for example, and variances were apportioned between inventories and cost of products sold, these methods would yield the same net income as that produced by complete absorption costing.

products leaving costs of unused facilities as volume variances chargeable to the period in which they are incurred.

The fourth listed method, that of direct standard costing, is a practice which has been given a great amount of consideration in the last decade. The practice involves a concept of product costs which includes only those overhead costs which are classified as variable--those overhead costs which are responsive to changes in production volume or are relatively constant per unit of product. By this method all fixed overhead costs are charged against revenues in the period in which they are incurred thus leaving no volume variance in any overabsorbed or underabsorbed overhead balances.

Prime standard costing is here suggested as a method whereby only standard direct material and direct labor costs are associated with products. This represents the opposite extreme to complete absorption of actual costs. Prime costing is seldom referred to in accounting literature as a possibility, yet it doubtless has some appeal to those accountants who claim to be conservatively minded by favoring the suppression of inventory valuations. There is also little doubt that the practice is actually used. If approved for income tax purposes--and it is likely to be accepted for relatively small manufacturing concerns if used consistently from year to year[1]--it provides a postponement

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[1]No tax rulings are available to provide absolute assurance of acceptance of this procedure for tax purposes; however, in the Geometric Stamping Company case, it was held that no adjustment of

of taxable income and therefore of tax liability. It also provides to those who are so inclined a way of by-passing the problem of selecting among the wide variety of methods of overhead absorption which might be used and the problems of interpretation and explanation of underabsorbed or overabsorbed balances and the segregation of fixed and variable overhead costs.

Illustrations of Effects of Various Concepts on the Calculation of Net Income

As a basis for further examination of these five practices and their related concepts of overhead and product costs an illustration is presented in the next several pages. In order to keep the amount of detail at a minimum and not allow it to obscure the pertinent considerations, certain simplifying assumptions are made. For example, the problem of highly diversified types of products and the voluminous detail of computing and relating product standards is ignored. A single product is, in effect, assumed. Also activity is stated in all cases as a percent of so-called practical capacity thus dodging any implication as to whether the unit of measure should be machine hours, labor hours, prime costs, labor costs, or something else. Further, actual material and labor costs are assumed to be equal to their respective standards.

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previous years' returns was required even though inventories were stated at prime costs since the method had been used consistently. The Geometric Stamping Company, CCH Decision 21740, Dkt. 50645, (May 22, 1956), U. T. C. -No. 36.

These assumptions and others that are made are not realistic, but none of them affect the validity of observations to be made.

Data to be used are as follows:

Budgeted variable production overhead cost per unit of product	$4.00
Budgeted fixed production overhead cost for the accounting period	$750,000.00
Practical capacity level of production at standard operating efficiency	100,000 units
Average or expected activity level as a percent of the practical capacity level of production	75%
Standard material cost per unit of product	$8.00
Standard labor cost per unit of product	$5.00
Selling and administrative cost for the accounting period	$550,000.00

	Period A	Period B	Period C
Actual production overhead costs	$1,020,000	$1,092,000	$997,500
Actual production activity as a percent of practical capacity	70%	85%	60%
Actual production (units)[1]	68,000	84,000	57,000
Sales @ $40 per unit (units)	65,000	70,000	75,000

[1] The reader will note that actual production in unit terms does not harmonize with percentages of practical capacity attained. It is assumed that a base other than units of production is being used for overhead cost assignments. The differences between the activity levels attained and the standard activity required for actual production represent efficiency variances, as shown in dollar terms in the figures of the following pages.

During the period just preceding period A, 65,000 units of product were completed of which 20,000 were on hand at the end of the period. Production activity was at 65% of practical capacity and overhead costs amounted to $1,072,500.

The following five figures present summarized income statements for three successive periods using the five different product cost concepts.

Figure 1

Income Statements Using Complete Absorption Costing

	Period A	Period B	Period C
Sales	$2,600,000	$2,800,000	$3,000,000
Cost of goods sold:			
20,000 @ $29.50, 45,000 @ $28.00	1,850,000		
23,000 @ $28.00, 47,000 @ $26.00		1,866,000	
37,000 @ $26.00, 38,000 @ $30.50			2,121,000
Gross manufacturing margins	$ 750,000	$ 934,000	$ 879,000
Selling and administrative expenses	550,000	550,000	550,000
Net income	$ 200,000	$ 384,000	$ 329,000

Figure 2

Income Statements Using Expected or Average Activity Standard Costing

	Period A	Period B	Period C
Sales	$2,600,000	$2,800,000	$3,000,000
Cost of goods sold			
65,000 @ $27.00	1,755,000		
70,000 @ $27.00		1,890,000	
75,000 @ $27.00			2,025,000
Gross manufacturing margins	$ 845,000	$ 910,000	$ 975,000
Overhead variances			
Budget	$ 10,000Cr.	$ 2,000	$ 7,500
Efficiency	28,000	14,000	42,000
Volume	50,000	100,000Cr.	150,000
Totals	$ 68,000	$ 84,000Cr.	$ 199,500
Net manufacturing margins	$ 777,000	$ 994,000	$ 775,500
Selling and administrative expenses	550,000	550,000	550,000
Net income	$ 227,000	$ 444,000	$ 225,500

Figure 3

Income Statements Using Practical Capacity Standard Costing

	Period A	Period B	Period C
Sales	$2,600,000	$2,800,000	$3,000,000
Cost of goods sold			
65,000 @ $24.50	1,592,500		
70,000 @ $24.50		1,715,000	
75,000 @ $24.50			1,837,500
Gross manufacturing margins	$1,007,500	$1,085,000	$1,162,500
Overhead variances			
Budget	$ 10,000Cr.	$ 2,000	$ 7,500
Efficiency	23,000	11,500	34,500
Volume	225,000	112,500	300,000
Totals	$ 238,000	$ 125,000	$ 342,000
Net manufacturing margins	$ 769,500	$ 959,000	$ 820,500
Selling and administrative expenses	550,000	550,000	550,000
Net income	$ 219,500	$ 409,000	$ 270,500

Figure 4

Income Statements Using Direct Standard Costing

	Period A	Period B	Period C
Sales	$2,600,000	$2,800,000	$3,000,000
Cost of goods sold			
65,000 @ $17.00	1,105,000		
70,000 @ $17.00		1,190,000	
75,000 @ $17.00			1,275,000
Gross manufacturing margins	$1,495,000	$1,610,000	$1,725,000
Overhead variances			
Budget	$ 10,000Cr.	$ 2,000	$ 7,500
Efficiency	8,000	4,000	12,000
Fixed production costs	750,000	750,000	750,000
Totals	$ 748,000	$ 756,000	$ 769,500
Net manufacturing margins	$ 747,000	$ 854,000	$ 955,500
Selling and administrative expenses	550,000	550,000	550,000
Net income	$ 197,000	$ 304,000	$ 405,500

Figure 5

Income Statements Using Prime Standard Costing

	Period A	Period B	Period C
Sales	$2,600,000	$2,800,000	$3,000,000
Cost of goods sold			
65,000 @ $13.00	845,000		
70,000 @ $13.00		910,000	
75,000 @ $13.00			975,000
Gross manufacturing margins	$1,755,000	$1,890,000	$2,025,000
Production overhead costs	1,020,000	1,092,000	997,500
Net manufacturing margins	$ 735,000	$ 798,000	$1,027,500
Selling and administrative expenses	550,000	550,000	550,000
Net income	$ 185,000	$ 248,000	$ 477,500

Figures 1 through 5 are summarized below in Figure 6 to show the relative effects of the various concepts upon computed net income and their relationship to sales and production levels.

Figure 6

A Comparison of Net Income Results of Five Overhead Costing Methods

	Period A	Period B	Period C	Totals
Sales (units)	65,000	70,000	75,000	210,000
Production (units)	68,000	84,000	57,000	209,000
Net income				
Method 1	$200,000	$384,000	$329,000	$913,000
Method 2	$227,000	$444,000	$225,500	$896,500
Method 3	$219,500	$409,000	$270,500	$899,000
Method 4	$197,000	$304,000	$405,500	$906,500
Method 5	$185,000	$248,000	$477,500	$910,500

Before attempting to analyze differences in results obtained by these five assumptions it should be noted that several elements which would vary in actual situations have intentionally been held constant. Selling prices per unit are assumed to be the same throughout all three periods, product standards are held constant except for the production overhead component, and selling and administrative costs are assumed to be the same for each of the three periods. Also direct material and

direct labor costs are assumed to be exactly equal to their respective standards so that no material or labor variances are produced. Thus the only factors allowed to change in the illustrations are sales volume in units, production in terms of both the activity measure and number of units produced, actual production overhead, and both the numerator and denominator used in the computation of the overhead rate, if applied. Differences in net income for any one of the three periods therefore reflect solely the effects of the five different concepts of overhead content of product costs, and fluctuations of net income over the three-period interval for any one of the five concepts are solely affected by changes in sales and production volume in terms of product units and changes in actual production overhead costs.

Generalizations as to Income Effects of Five Concepts

It may be noted from Figure 6 that computed net income varies from $185,000 to $219,500 in period A, from $248,000 to $444,000 in period B, from $225,500 to $477,500 in period C, and from $896,500 to $913,000 for the entire three-period interval, depending upon the method or concept of content of product cost used. These are surely substantial variations. Further, although the methods used are arranged generally in what some accountants might refer to as an order of increasing conservatism, the results do not bear out this suggestion. The largest income figures are produced by methods 2, 2, 5, and 1,

respectively, for the three consecutive periods and for the three-period interval, and the smallest income figures are produced in similar sequence by methods 5, 5, 2, and 2.

These figures not only refute the proposition that the methods are listed in order of increasing conservatism for income computations; they also appear to shed no light at all upon the relative conservatism of the five methods. This latter indication is not an artificial result conditioned by the data used. It is an indication of fact. These five methods of associating overheads with product units and the corresponding concepts of content of product costs are arranged generally in order of increasing conservatism, if one considers only static inventory valuations. As many accountants have pointed out, however, the integration of asset valuation and income reporting, which is basic to the accounting process, prevents continual and unending suppression of both asset and income representations. Conservatism in income reporting, in the sense of minimizing the favorability of the income figure, may be accomplished via the overhead assignment route only by continually increasing the degree of suppression of inventory valuations in terms of the absolute amount of its overhead cost content. Theoretical limits to such a practice are placed by an infinite build-up of inventory quantities and the decrement of dollar valuations to zero. Practical limits to the procedure, of course, provide a much narrower range of possibility.

What then is the relationship between the use of the various

concepts and reported income? Under what circumstances will certain concepts give a higher income figure and under what circumstances will they give a lower income figure than others? What factor or factors determine the degree of variation of the results produced by the various methods? These questions must be investigated before reasonable conclusions as to the propriety of the various methods can be reached.

The variation of reported net income as among these five methods is determined by the relative amount of increase or decrease of the absolute overhead cost content of beginning and ending product inventories. In the illustrations it has been assumed that all goods are completed at the end of each period so that the finished goods inventory is the only one to be considered. This assumption has been made for purposes of simplicity. If work-in-process inventories are involved their overhead cost content must also be recognized in a reconciliation of results of the various methods.

Taking period B and methods (1) and (4) as an example, the $80,000 difference in net income may be reconciled as shown in Figure 7 on page 87. This type of reconciling analysis may make it necessary to offset increases against decreases and involve mechanically the subtraction of a negative number from a positive number or vice versa. For example, methods (1) and (2) may be compared for the entire three-period interval and the $16,500 difference in net income may be reconciled as shown in Figure 8 on page 88.

Figure 7

Reconciliation of Reported Net Income for Period B as Computed by Methods (1) and (4)

	Method (1)	Method (4)
Overhead cost content of beginning inventory:		
23,000 units @ $15	$345,000	
23,000 units @ $4		$ 92,000
Overhead cost content of ending inventory:		
37,000 units @ $13	481,000	
37,000 units @ $4		148,000
Increase of overhead cost content of inventory during the period	$136,000	$ 56,000
Increase of overhead cost content of inventory during the period—by method (4) above	56,000	
Excess of increase of overhead cost content of inventory by method (1) over that by method (4), and difference in net income	$ 80,000	

Figure 8

Reconciliation of Reported Net Income for the Three-period Interval as Computed by Methods (1) and (2)

	Method (1)	Method (2)
Overhead cost content of beginning inventory:		
20,000 units @ $16.50	$330,000	
20,000 units @ $14.00		$280,000
Overhead cost content of ending inventory:		
19,000 units @ $17.50	332,500	
19,000 units @ $14.00		266,000
Increase or (decrease) of overhead cost content of inventory during the period	$ 2,500	($14,000)
Decrease in overhead cost content of inventory during the period by method (2) as above	14,000	
Excess of increase of overhead cost content of inventory by method (1) over that by method (2), and difference in net income	$ 16,500	

In periods in which sales exceed production and product inventories are thereby depleted, methods (1) and (2) will generally tend to yield the lowest income figure and method (5) will always tend to yield the highest income figure. In periods in which production exceeds sales and product inventories are thereby increased, the reverse will be the tendency. To generalize, the method which assigns the greater or greatest portion of actual overhead costs to products will yield the higher or highest computed income in periods of product inventory build-up and the lower or lowest computed income in periods of product inventory diminution.

In addition to being a function of inventory build-up or diminution the amount of variation of reported income as produced by the various concepts of overhead association with products is dependent upon the degree of variability of overhead costs in response to changes of production levels. If production overhead costs were 100% responsive to changes of production levels, methods (2), (3), and (4), as illustrated, would yield the same results and method (1) would yield an income figure differing only by the amount of the budget variance which may be expected to be relatively small. The greater the tendency for production overhead costs to be fixed in absolute amount per accounting period without regard to production levels, the greater will be the divergence of results obtained by the first four methods when sales and production volumes differ. It may in fact be shown that by the use of any one of

the first three methods, all of which represent types of absorption costing, that reported income will differ from that resulting from the direct costing plan by the product of the fixed component of the overhead rate per product unit and the absolute number of product units by which production and sales differ.

Summary and Conclusions

There is a need for a clearer understanding of overhead costing for income determination purposes. The problem has been treated very sparingly in accounting writings generally, and the Committee on Accounting Procedure of the American Institute of Accountants has done little to fill the void. There has been some evidence of "buck passing" between public and industrial accounting groups with attending incomplete consideration by either group.

It seems reasonable that this problem should be placed squarely on the shoulders of professional or public accountants. Although industrial or cost accounting is not entirely divorced from general or financial accounting, the natural emphasis of industrial accountants is upon cost figures for managerial uses, as it should be. In a very broad way, net income figures are significant for control and planning purposes, but more detailed reporting of costs as recorded for the past or as anticipated for the future is much more significant to management,[1] and thus

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[1] See the statement of the Committee on Cost Concepts and Standards, "Tentative Statement of Cost Concepts Underlying Reports for Management Purposes," The Accounting Review, (April, 1956), p. 182.

cost accountants may well concern themselves with problems other than that of over-all income measurement.

The net income calculation involves the matching of inputs and outputs of a business entity, recognizing reasonable relationships of one to the other. The sales transaction has gained general use as a crude measure of output. It is used as the signal for the matching process. In order to match reasonably inputs with recognized outputs it is necessary to give effect to the lag between cost applications and their realization in the form of revenues. The association of production overhead costs with units of product provides a useful tool for deferment of these inputs and for the timing of the matching procedure.

There has been some concern among accountants as to whether costs of selling and administration should follow the product route in being offset against revenue or charged as incurred to the revenue stream. These costs should be considered just as significant and productive as so-called "production costs," yet their connected benefits are not necessarily or as obviously tied to disposition of products. Accountants would do well to study the problem of reasonable matching of these costs with revenues with no stigma against deferments, but product units do not provide the necessary tool.

If the income effects of various product overhead cost concepts are examined it may be shown that reported income varies in direct relationship with changes in the overhead cost content of inventories. No

conclusions may be drawn with regard to relative conservatism of various procedures. Over the long run any method will yield the same net income result; thus the problem is one of effects upon timing of net income reporting or one of periodicity. The problem of selecting an overhead cost concept suitable for periodic income determination is, nevertheless, important. The concepts illustrated in this chapter are examined from the standpoint of theoretical justifications in Chapter IV.

CHAPTER IV

A CRITICAL REVIEW OF VARIOUS CONCEPTS OF PRODUCTION OVERHEAD CONTENT OF PRODUCT COSTS FOR FINANCIAL ACCOUNTING PURPOSES

Having reviewed the various concepts of inventoriable overhead costs and their effects upon income measurement it seems appropriate to attempt to establish whatever theoretical and practical justification may exist for each of the possibilities. Which method or methods are most reasonable in view of the recognized objectives of accounting income determination?

It is suggested in Chapter III that income determination may be thought of as an attempt to measure the economic progress of a business venture. The compelling need for a degree of objectivity and uniformity of practice has caused the accounting profession to set up principles, concepts, basic assumptions, postulates, and informal rules of procedure which serve to restrict the variety of methods by which such an objective is accomplished; yet this measure of economic progress is a fundamental determinant of accounting income measurement. To evaluate the various concepts which have been illustrated, each must be

reviewed in the light of income measurement and those restrictive rules which serve to create a needed degree of uniformity and objectivity.

The five concepts referred to in Chapter III may be classified basically into three categories. Method (1), complete absorption costing, involves the assumption that all production overhead costs of a particular period are costs of products produced during that period; methods (2), (3), and (4), expected or average activity standard costing, practical capacity standard costing, and direct standard costing, respectively, imply that only a variously defined standard amount of production overhead costs should be considered costs of product produced; and method (5), prime standard costing, denies any relationship between production overhead costs and product units. Thus the problem may be summarized as follows: First, should any overhead costs be considered costs of tangible products? Second, if the answer to the first question is in the affirmative, should the total of such costs or only a so-called standard or normal amount be assigned? And third, if a so-called standard or normal amount rather than the "actual" amount is to be assigned, how is such a standard amount to be determined? These questions will be considered in this sequence in the following pages.

Should Any Production Overhead Costs be Associated with Product Units?

In Chapter III, the problem of income measurement has been envisaged as a process by which costs (inputs) are matched against

revenues (outputs). If revenues were recognized as contributors to income at the time of utilization of services acquired, all costs of such service factors would be matched at the point of incurrence so that cost assignments to products would not be relevant to the calculation of income. Since the realization postulate, usually subscribed to as a matter of practice, delays revenue recognition until disposition of the product is made, the logic of postponing the matching of costs is apparent.

Costs of materials which become physically embodied in the completed product and services which are obviously essential to the production of tangible goods and may be directly assigned thereto are, as a matter of both practice and theoretical logic, considered to be at least a part of the cost of such physical goods. They are matched with resulting revenues as sales are made. Limiting product costs solely to such items in most cases amounts substantially to "prime costing" or the assignment to products of only direct material and direct labor costs.[1] This practice has some appeal to those accountants who are hesitant to enter areas where logic and reasonable judgment, inevitably attended by a considerable margin of possible error, are required.[2]

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[1] It is interesting to note the effect that such a practice would have on inventory valuations and thus on periodic income calculations in certain industries. In the chemical industry, for example, the direct labor factor as it is usually thought of is hardly existent. There is little or no physical fabrication involving the direct association of labor effort with product units.

[2] For an example of this apparent appeal reference may be made to an article by Oswald Neilsen which appeared in the January, 1954, issue of The Accounting Review under the title of "Direct

However, this reluctance can hardly be justified. Accountants who strive for reasonable income measurement must necessarily deal with problems the solutions to which are based on a degree of subjectivity. The cost of supplies used at a particular machine location, for example, should not be entirely disassociated with products and thus rejected as potentially postponable as an offset to corresponding revenue just because a wide variety of goods is processed at the location and therefore association of such costs with products involves a judgmental decision as to a method of assigning or prorating.

Income measurement involves many uncertainties, and estimates and approximations must be made. It is far better to persevere towards a degree of accuracy and precision in the matching of inputs and outputs, recognizing the margin of error involved, than to yield to the simplicity and objectivity made possible by dodging major problem areas.[1]

Costing--The Case 'For' " p. 89.

Also as an illustration of such a procedure resulting from a previous adoption of the direct costing technique reference is made to a letter to the Editor of the N. A. C. A. Bulletin written by Ralph W. Sauber and published in the March, 1954, issue of the N. A. C. A. Bulletin, p. 907.

[1]It is doubtless that some favor for exclusion of all indirect costs has been brought about by an awareness of dangers involved in apportionment of such costs for purposes of product pricing, product diversification, make-or-buy problems, and other managerial decisions not dependent upon over-all profitability statistics. This is a prime example of narrow thinking which can envisage only a single product cost concept. Although exclusion of all overheads from product cost concepts is sometimes practiced, most accountants do not attempt to justify the procedure on grounds other than expediency or the time-honored, and

The 1952 Committee on Cost Concepts and Standards of the American Accounting Association stated in their unpublished report that "overhead cost allocations should be related in a logical manner to the basic activity which gives rise to these costs" and that

> for financial accounting purposes, cost data should be measured so as to indicate the investment in a unit of output with the aim of eventually matching properly that investment against income. [1]

The failure to associate indirect costs or production overheads to inventoriable product units falls far short of accomplishing these objectives.

To refuse to consider the possibility of postponement of the matching of costs which are only indirectly related to tangible products until the time of the sale transaction is equivalent to insisting that a firm is worse off for having made the investment in plant, supervision and maintenance personnel, and other facilities unquestionably essential to the production of salable goods. It is a denial of the assumption of transferred values (that costs attach) which is basic to the entire problem of income measurement using accrual accounting techniques. It reflects an unwillingness to match inputs with corresponding outputs--an

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perhaps timeworn, justification of conservatism. They usually emphasize the relatively slight effect upon reported income when the practice is applied consistently.

[1] L. J. Benninger, "Development of Cost Accounting Concepts and Principles," The Accounting Review, (January, 1954), p. 37.

unwillingness to adapt to the impact of the realization postulate upon the basic concept of matching. Thus it seems that the exclusion of all overhead costs from product inventory valuations is wholly untenable in the area of income determination and that alternative (5), that of prime costing, is void of reason.

The problem is not yet solved. If production overhead costs must not be excluded entirely from product cost concepts for income determination purposes, should all of such costs be associated with product units or should only a portion of them be included--perhaps a so-called standard or normal amount?

Should All Production Overhead Costs be Associated with Product Units?

Accountants have long been concerned with the possibility of unwarranted postponement of the matching of costs against revenues, and overhead cost absorption has provided a substantial potential area for subjective manipulation of this sort. The rapid growth of industrial mechanization during the first two decades of this century and the attending increased proportion of constant or fixed costs caused accountants and businessmen to examine more closely the phenomenon by which production costs per unit tended to vary in inverse relationship with production levels. They began to question the logic of the accounting methodology which produced the tendency for inventory valuations

per unit to be high in periods when sales were difficult to make and low in periods when sales were made more easily.

The time-honored principle of carrying inventory at "cost" served to provide a palatable degree of justification for complete absorption when production levels varied only slightly, but with extreme swings in production levels of certain industries, unit costs varied through such a wide range as to make it difficult to justify them for income determination, or for any other purpose. The development and use of normal overhead charging methods provided the practical answer. This practice, although variously interpreted so as to represent at one extreme an approach to the use of equalized actual costs or at the other extreme, the use of engineered standards which are presumed to represent "true" product costs, has been given general recognition for both cost and financial accounting purposes. As sometimes conceived the practice will assign virtually all production overhead costs to products over an extended time period but it invariably represents a departure from the assignment of total periodic actual overhead costs to corresponding periodic production.

In 1947, the National Association of Cost Accountants published the results of a survey of 150 companies with regard to costs included in inventory. Of these companies 127 used normal overhead rates and 116 treated underabsorbed overhead balances as charges to the current

period's revenues. Thus slightly over 77% of the companies surveyed did not charge actual total indirect production costs to products.[1] They considered the costs which represented deviations from predetermined amounts as "period costs" affecting current income.[2]

The evolution of treatments related to production overhead has been traced in Chapter II. Predetermined rates, although first used to provide prompt total cost information, were soon justified by many accountants and engineers as means of normalizing or equalizing per-unit assignments. Their use has become generally accepted procedure.

On theoretical grounds the association of production overhead costs with products is based upon the principle of transferred values (that costs attach). This principle, which has already been discussed, has as its foundation a theory of causation. If no cause or effect relationship can be found to exist between production costs incurred and product produced, the association cannot be justified. In such cases the costs should be promptly offset against revenues for income determination purposes.

Examples of this lack of relationship may be noted. Costs

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[1] National Association of Cost Accountants, "Costs Included in Inventories," Research Series Number 10, N. A. C. A. Bulletin, (August 15, 1947), p. 1601.

[2] It is interesting to note that 114 of the 116 companies also treated overabsorbed overhead balances as credits to current income. This, it seems, should cause some concern to accountants as causing an overstatement of net income.

pertaining to completely idle facilities which are at a far distant geographical location--perhaps another country--from the currently operating plant are surely not related to current production. Similarly, costs occasioned by an inoperative department are not reasonably associated with products produced by other departments. As other examples, if production supplies are stolen from a plant or if a newly employed worker proves to be detrimental rather than beneficial to producing activities the attendant costs should hardly be associated with products. Notwithstanding the acceptance of transferred values, it seems reasonable to admit that there is a limit to the degree of inefficiency, waste, and inactivity where total recorded production costs become inappropriate as charges to the few resulting product units when considered strictly in terms of cost flows. Alternative (1), that of total absorption costing, therefore, cannot be justified as a general practice.

Next should be considered the problems of determining the amount of production overhead costs which should be associated with products under various circumstances. Does direct costing, the use of practical capacity rates, or the use of expected or average activity rates cost products reasonably in the attempt to determine income? Are "actual" or "engineered standard" costs appropriate?

What Portion of Production Overhead Costs Should be Associated with Product Units?

Conceding the existence of maximum limits upon the degree of waste and inefficiency and minimum limits upon activity levels beyond

which complete overhead absorption is unjustified, one is led to the third question, as previously stated; that of determining the portion of production overhead costs chargeable to product units.

During the last decade a procedure known as "direct costing" has been strongly championed by many cost accountants. This procedure has brought with it a concept of product cost which includes only "variable" overhead items; i. e., costs which are deemed to vary sympathetically with production levels. It may be shown that when overhead costs are classified into fixed and variable groups, budgeting for changed production levels is facilitated. When only variable costs are assigned to products the determination of a so-called contribution to fixed overhead is made possible, break-even levels of activity are made obvious, and relative results of product lines are easily computed.

When met with retorts of critics to the effect that these advantages can be had without allowing the technique to affect income measurements, advocates of direct costing have insisted that fixed overhead costs are not costs of products but costs of standing ready to produce. As such they represent appropriate charges against revenue in the period in which they are incurred and recorded.[1] The criterion of cost behavior has thus been suggested as a significant determinant of product costs.

The growth of popularity of predetermined normal burden rates in

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[1] Donald L. Raun, "The Problem of Fixed Charges," The Accounting Review, (July, 1951), p. 343.

the past half century resulted from efforts of engineers, cost accountants, and efficiency minded business men who approached accounting from the engineering viewpoint as a means of providing statistical measures of operating efficiency. To such individuals widely fluctuating production levels and fixed tendencies of many overhead costs were deterrents to their efforts to attach actionable significance to cost changes. In most cases complete absorption of overhead costs served to diffuse costs of inefficiencies with little regard for centers of responsibility. It emphasized aggregate changes of costs of products allowing increased or decreased efficiencies which might be controllable within limits to be offset or overshadowed by the effects of volume changes which were usually less controllable, at least in the short run. The practice complicated rather than clarified the areas of cost incidence where corrective action was in order.

Engineers and cost conscious accountants therefore looked with favor upon changes from total absorption to the use of "normal rates" based on planned or budgeted overhead costs and activity levels reflecting primarily production capacities and techniques with little or no regard for sales potential. The result was the segregation of substantial underapplied balances which could be analyzed into components of waste and inefficiency and costs of idle facilities by those interested primarily in efficiency index costs. The development and acceptance of standard costs generally, including all types of manufacturing costs,

and their effective use as tools for measuring and improving production efficiencies has added respectability to the exclusion of certain production overhead items from product costs.

Although the use of normal or standard overheads was not originally conceived as a procedure to sharpen income determination, many of the proponents of these procedures have come to justify them, at least in part, on such grounds. They argue with a certain amount of apparent logic that the economic significance of product units cannot be enhanced by short-period abnormalities or by increased waste and inefficiency, and that it is hardly tenable to hold that costs in the form of depreciation, taxes, insurance, and maintenance of unused equipment are costs of products. Thus efficiencies and plant utilization are suggested as significant criteria for determination of product costs.

In direct costing and in the use of normal or standard costs one can see a tendency which may be observed in many areas of accounting. An accounting or analytical technique which is devised for certain special purposes is forced by its enthusiastic proponents, who often use dubious claims of practical advantage, into other roles where its application may be questionable. In instances where a segregation of variable costs is theoretically possible and practicably feasible, the analytical technique implicit in the direct costing idea provides interesting and very useful information bearing on managerial decisions with regard to pricing, product selection, volume considerations, and

promotional emphasis. It surely has been proved that standard costs of processes and products, including a standard amount of production overhead, are useful in planning and controlling production activity and in promoting efficient operations. Whether or not variable overhead costs alone should replace "complete" or "total" overhead costs, or whether or not standard or normal overhead costs should replace "actuals" for income determination purposes must be considered in light of completely different criteria. Costs should be associated with product units for income measurement purposes so as to time properly the matching of the sacrifices which they represent against the benefits produced and measured as realized revenues.

Variations of practice with regard to overhead cost associations with products may, for the most part, be classified into the three concepts produced by use of "actuals," "normal or standards," and "direct costing." The use of "actuals" has already been ruled out as a proper approach under all circumstances. Next will be considered the inclusion of only variable costs as is dictated by the "direct costing" method.

Direct Costing

Direct costing is a popularized term which has been applied to a procedure involving (1) the classification of all production costs into those which are fixed in total amount and those which vary in total amount in direct relationship to changes in production activity, and (2) the treatment of fixed production costs as "period costs," completely

unrelated to products, and the associating of only the variable production costs (either actual or standard amounts) with product units.[1] Arguments in favor of direct costing are usually in terms of treatments afforded fixed and variable costs no matter what the natural cost elements may be. As a matter of practice, material and direct labor costs are generally deemed to be variable so that the procedure relates solely to the handling of fixed and variable overhead costs. Some advocates of direct costing stress that the first of these two features of the procedure is the more important and that the second is of secondary importance.[2] However, many accountants emphasize the advantages of the procedure as a means of measuring net income.[3] There is little new or novel about the segregation of fixed and variable costs, and the emphasis upon the possibilities of analyses based on this segregation is all to the good. The second feature of the procedure as stated above

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[1] Perhaps the most quoted definition is that provided by Waldo Neikirk in an article entitled "How Direct Costing Can Work for Management," N. A. C. A. Bulletin, (January, 1951), p. 525. Here he states that "direct costing should be defined as a segregation of manufacturing costs between those which are fixed and those which vary directly with volume. Only the prime costs plus variable overhead costs are used to value inventory and cost of sales. The remaining factory expenses are charged off currently to profit and loss. However, the point to be emphasized is that direct costing is primarily a segregation of expenses and only secondarily a method of inventory valuation. By this approach, full attention can be devoted to the effect which direct costing has on the profit and loss statement and supplementary reports."

[2] Ibid., p. 525.

[3] Raun, op. cit., p. 343, and many others.

is, however, a very significant departure from conventional practice. It strikes at the very heart of the problem of measuring net income.

Here it is suggested that costs which are not subject to change as a result of changes in production levels have no affinity to products and should therefore necessarily be recovered in total from the current period's sales before there can be any chance of profitability. Proponents of the procedure make much of the suggestion that fixed production costs are costs of standing ready to produce; whereas, variable costs are costs of producing. They point out that income determination is based on sales transactions and that only by direct costing will income tend to vary solely as a function of sales. If fixed costs are assigned to products it is shown that income may be calculated to be a greater amount in a period of low sales than in a period of high sales solely as a result of changes in production level and the change in the fixed cost content of opening and ending inventories. It has been suggested that in such cases unrealized income is recognized.

The calculation of net income has been envisaged as a matching process. It is by necessity a twofold activity of measuring and comparing revenues and revenue charges. Net income as measured by accountants may be increased either by an increase in revenues or a decrease in revenue charges and net income may be decreased by the reverse occurrences. The realization problem is applicable to the measurement of revenues and direct costing relates to the measurement

of periodic revenue charges. Although it is not difficult to understand how calculated net income becomes in part a function of production when fixed costs are assigned to products, it clouds the issue to suggest that the recognition of unrealized income may be involved.[1] When inventories increase, the assignment to products of fixed costs will give a larger net income than will direct costing as the result of revenue charges being lower. This does not mean that unrealized income has been recognized. The net income measured is still tied to the sales transaction as the timing signal for revenue recognition.

The production of income necessarily involves acquisition (by purchase, fabrication, or both) of goods or services in the market place. Accounting theory has made the market place exchange the signal for recognition of revenue. This makes it impossible to have a positive net income result without sales transactions. To say that sales are absolutely necessary to the yielding of net income is, however, not the same as saying that no other factor may have its effect. In accordance with accepted accounting theory based upon the realization postulate it is not possible to show a net income without a sale, yet it is possible to show a greater or lesser net income in periods of equal sales as the result of both production and distribution. Calculated

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[1] It might indeed be just as appropriate, if not more appropriate, to hold that the offsetting of production costs against periodic revenue purely on the basis of their tendency to be fixed in amount represents a failure to recognize realized income.

net income should show the effects of both production levels and sales volumes coupled with prices paid for services (or goods) used and prices obtained for services (or goods) sold.

The conflict between direct costing and absorption costing, as with most accounting conflicts, is caused by the problem of periodicity. If the accounting period used for income determination were the entire life span of a business organization, revenues and revenue charges would be objectively measurable and the whole of one could be matched against the whole of the other. There would be no problem as to which affords the signal for matching. There would be no problem as to whether net income is a function of sales or of production. Net income would reasonably be assumed to be the combined result of the two activities. As the time span over which net income readings are taken is shortened, the measurement of results of production and sales becomes more and more subjective,[1] but the net income result, when calculated, remains a function of both activities. In a short period when more goods are produced than are sold the net income is more favorable than if production had been at the same level as sales. This results from

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[1] W. A. Paton and A. C. Littleton sound a warning in this regard. They say, in discussing short-term assignments of costs, that "the difficulties of measuring net income soundly even on an annual basis are so great as to raise serious question as to the desirability of encouraging the development of monthly or quarterly income statements." They even suggest the advisability of confining short-term reports to volume data and a list of operating charges with no indication of a net income figure. An Introduction to Corporate Accounting Standards, (American Accounting Association, 1940), p. 77.

the more effective utilization of facilities or greater benefit yielded by fixed cost factors. These benefits should surely be recognized. The recognition of unrealized income happens only as a result of giving effect to assumed market place factors applicable to goods still unsold. It cannot result from the association of cost dollars with products produced in order to postpone offsetting against revenues yielded by the sale of such products.

It has been argued that the association of fixed production costs with products makes it possible for management to manipulate profits at will by merely increasing or decreasing the level of production and that allowing this possibility reflects disparagingly upon the accounting method. This argument is surely unwarranted. Once accountants attempt to set up postulates and recognized accounting procedures with the hope of bringing about a degree of uniformity and objectivity in the measurement of periodic net income, they open the door for possible discretionary action by business management to manipulate reported profits. The general use of the sales transaction as the signal for revenue recognition, for example, makes it possible for a willful management to somewhat artificially affect reported profit by juggling the timing of deliveries of goods. Even though accountants generally are aware of such a possibility, they have not found cause to change or forsake this most useful realization postulate.

It is hardly feasible to suggest that the management of an enterprise would time deliveries to the overall detriment of the financial

well-being of the organization, and therefore, concern by the accountant for possible deliberate actions of this kind is almost non-existent. Similarly it seems unwarranted to assume that management would be so irrational as to produce goods far in excess of the quantity which may be expected to be sold in a reasonable period of time or in such a small quantity as to seriously deplete inventories just in order to make a good or bad showing, as the circumstances might dictate, for a particular accounting period.

It should also be pointed out that by the use of the direct costing procedure the potential area of manipulation of profits by artificially timing sales transactions is greater than it is by conventional absorption costing methods. This results from the wider margins between sales prices and variable costs of products than between sales prices and "full costs" of products.

From a purely theoretical viewpoint the essence of the direct costing procedure for income determination is found in the implication that cost behavior tendencies are pertinent to the question of postponability of costs for matching against revenues. This idea is not reasonable. The essential test of assignability of costs to revenues is "economic reasonableness in view of all pertinent conditions."[1] "Any type of cost may be 'deferred' if it originates in a justifiable expenditure and represents a factor from which a future benefit or contribution

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[1] W. A. Paton and A. C. Littleton, op. cit., p. 65.

can reasonably be anticipated."[1] Certainly costs recorded under the caption of depreciation, for example, represent portions of justifiable expenditures from which future benefits are expected in just as real a sense as costs in the form of wages paid to production employees.

By the direct costing procedure depreciation recorded as a function of activity, such as the use of a machine hour rate for production machinery, is associated with products. If, on the other hand, depreciation were recorded as a function of time, the cost would be offset against current revenue without regard to products produced. This provides an illustration of the unreasonable artificial nature of the direct costing procedure for income reporting.

As another example, the charging of costs of services rendered by salaried employees to current revenues while those of hourly-rated employees follow the product route is untenable. To do so means that a change of the methods by which a particular employee's pay is computed can have a noticeable effect upon the short-term calculation of income. The difference in alternatives allowed to management by these two types of employment arrangements is significant but it is difficult to justify different treatments for income measurement purposes.

From a more practical viewpoint the difficulty of segregating costs between fixed and variable categories is significant. Costs are

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[1] Ibid.

neither fixed nor variable by nature. They merely differ in the degree to which they tend to move sympathetically with changes in activity levels and in the rapidity with which such movements come about. The making of a simple two-way classification involves much subjective latitude. Those who seem concerned with potential profit manipulation under an absorption costing procedure as the result of changed production levels may well be reminded of this feature of the direct costing procedure.

Although direct costing purports to emphasize the general distinction between fixed and variable costs, as usually applied it involves the charging of all material and so-called "direct labor" costs to products and considers only the behavior tendencies of overhead costs. The presumption is apparently made that material and direct labor costs are wholly variable. This is often not the case, especially with reference to direct labor. It appears that, although not recognized, emphasis is being placed upon the distinction between "direct" and "indirect" costs and, in some cases, between services provided by employees and services provided by inanimate equipment and machinery. The direct and indirect classifications are distinctions made in view of practical considerations which cannot reasonably bring about theoretical significance to the results produced. In the area of income determination, as well as in many other areas, care must be taken not to confuse the practical direct-indirect classification of costs with behavior classifications such as the fixed-variable dichotomy.

The awareness of behavior patterns of production costs, as well as other costs, is of prime importance to the effective operation of a manufacturing enterprise. Business managers should be cognizant of the relative limitations upon their ability to act to control different types of costs, but this does not alter the reasonableness of the presumption that products result from a combination of the skill of workmen, the capabilities of machinery and equipment, and the environment provided by general physical facilities and supervisory personnel. To show favor toward certain costs based upon their tendencies for change, as is done under the direct costing procedure, is a denial of this most reasonable conclusion.

From a purely practical standpoint, the strong "disbelievers" in direct costing as a tool for income measurement should keep in mind that their contention relates only to short-term income reporting. If inventories are relatively constant and/or fixed costs, as designated, are only a small portion of total production costs the practical significance of controversy in this area is small. If, on the other hand, sales and production levels do not fluctuate sympathetically and inventory quantities thus vary through a wide range, the import of the question is substantial.

The use of direct costing for income measurement is not sound. If condoned for such purposes it should be done solely as an expedient

with a full awareness of the magnitude of its effect upon resultant income representations.[1]

Standard or Normal Costing Including Fixed Cost Items

Most accountants assaying the question of the use of standard or normal overhead costs as opposed to "actual" costs point out that the answer depends upon to which of two schools of thought one happens to belong. One school of thought, championed by enthusiastic advocates of standard costs and efficiency minded engineers, insists that predetermined costs of products if properly developed are the only "real" costs of products and that any deviation of "actual" costs therefrom are necessarily nonproductive costs of idle equipment and machinery, waste, and inefficiency and therefore subject to immediate matching against the revenue stream. Members of the other school of thought argue that even though standards may prove useful as a management tool in the control of efficiency, the only "true" cost of products is

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[1] Although the Committee on Accounting Procedure of the American Institute of Accountants has not faced this problem precisely, Carman G. Blough, the Institute's Director of Research has stated that direct costing "is not in line with the Committee's concept of proper inventory cost determination since, in many situations, it results in the exclusion of major items of recurring factory overhead. . . . In view of the fact that the Committee on Accounting Procedure has not favored the exclusion of fixed overheads in the costing of inventories, the fact that the almost universal practice has been to include them, and the fact that revenues are not matched with related costs if they are excluded, it seems clear to us that it is a violation of generally accepted accounting principles to treat material amounts of overhead as 'period' costs rather than as costs of production to be allocated to inventories." Carman G. Blough, Editor, Accounting and Auditing Problems Section, Journal of Accountancy, (April, 1955), p. 64.

their so-called "actual" cost and that if standards are used in the accounts, periodic adjustments should be made for determination of inventory valuation or deferrable product costs.

There has been a considerable amount of inarticulate or loose writing in this general area, especially in context of discussions of dispositions of variances from standards. Clifford G. Wood, for example, makes reference to the two general schools of thought and refers to the proponents of standards as "real" costs by saying that

> their contention is not so much that this excess over standard (standard cost variances) is not a cost, but that it is a cost of waste or inefficiency and should not be confused with the cost of goods or product. [1]

This use of the term "cost" is not clear. If, as often used but of questionable propriety, the term applies to those sacrifices occasioned by the production of goods as opposed to other sacrifices which are deemed to have no causal relationship to tangible products, Mr. Wood's indication that the enthusiasts for "standards" in inventory do not contend that variances are not a cost is inaccurate. If, on the other hand, the term "cost" is used more appropriately to refer to any justifiable economic sacrifice, then the comment is irrelevant. Mr. Wood surely means simply that one school of thought associates variances from standards with product units which may be inventoried and the other

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[1] Clifford G. Wood, "Disposition of Variances from Standards," N. A. C. A. Bulletin, (January 1, 1939), and republished in The Control and Valuation of Inventories, (New York: National Association of Cost Accountants, 1941), p. 237.

associates such costs with inefficiency and waste which are not postponable as charges against the revenue stream.

Writing also on this subject Clinton W. Bennett states that

> there are two rather distinct schools of thought with respect to standard costs. One of these schools believes that the standard costs are the real costs, that they should be prepared as the result of management decisions and are intended to reflect the anticipated cost of the products under an assumed set of circumstances and at a given level of output over a period of several years. This philosophy having been accepted, it logically follows that any differences between these standard costs and the actual results do not represent product costs at all but instead gains or losses due to variations in manufacturing or operating efficiency. It logically follows . . . that . . . these cost variances will have no place in cost of sales but will be regarded as additions to or deductions from the operating profit to arrive at the actual operating profit.
>
> The other school of thought . . . simply looks upon the standard costs as a device for providing relatively satisfactory product costs as a substitute for historical costs. . . . Hence, the standard costs are adopted in substitution because they qualify satisfactorily. . . . It logically follows that the cost of sales should be priced at the actual cost and not at the standard cost, and that therefore all cost variances should be closed into cost of sales before determining the operating profit or loss for the period.[1]

It would seem that this commentary relates solely to statement presentation of variances and not to any variation of the final determination of income.

Then Mr. Bennett clouds the picture further by reminding his readers that

> it should be recalled that this discussion with respect to the isolation and handling of cost variances refers entirely to procedures

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[1] Clinton W. Bennett, "Standard Costs in the Accounts," Industrial Accountant's Handbook, Wyman P. Fiske and John A. Beckett, editors, (New York: Prentice-Hall, Inc., 1954), Chapter 9, pp. 351-352.

> to follow from month to month and not at the end of the fiscal year. At the end of the fiscal year or other fiscal period all costs, whether actual or standard, should be closed into cost of sales in order that the final income statement will reflect fairly the operations of the period devoid as far as possible of unnecessary accounting niceties. [1]

This would surely be interpreted to mean that there is no controversy over the annual calculation or presentation of net income results. It is hard to believe that these are the intended interpretations. These statements are not limited solely to overhead standards but surely they are intended to include this cost element. They do not clarify the nature of the problem. They do help to indicate some of the difficulties of semantics that are involved as well as several related aspects of the basic problem. The problem may be stated as follows: Assuming the practical possibility of segregating production overhead costs from other costs, what portion of the production overhead costs should be traced directly to current revenues and what portion should be attached to physical products and thus matched against revenues as sales are consummated?

When only standard production overhead costs are absorbed in product units it is customary to segregate underabsorbed or overabsorbed amounts into the portion indicative of the effect of the relationship between actual and planned activity levels, and another portion which reflects the excess of recorded overhead costs over planned

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[1] Ibid., p. 352.

costs for the activity level attained, or an activity variance and a budget or spending variance, respectively. The question at hand may be considered in terms of these measures of idleness and inefficiency. Attention is given first to volume or activity variations.

The problem of volume variances relates to the assignment of fixed costs since these are the costs which continue irrespective of volume changes. The direct costing procedure which relates all fixed costs to current revenues has already been considered and generally repudiated as a technique for income measurement. In contrast with direct costing is another procedure usually referred to as "absorption costing." The term has in fact become popularized somewhat recently as the result of the avalanche of literature treating "direct costing versus absorption costing." Absorption costing envisages the association of overhead costs with products without regard to cost behavior. The term is not definitive, however. It related to a procedure by which some fixed overhead costs as well as variables are assigned to products. It does not spell out the amount or portion of fixed costs so assigned.

The mechanics of absorption costing procedures involve rates which are computed on the basis of predetermined activity levels related to some time interval. These rates are applied to comparable measures of actual activity, thus relating production overhead costs to products produced. The amount of fixed overhead costs assigned

to products and the amount charged to the current period as "cost of idleness"[1] are therefore functions of the predetermined activity level and the length of the time period used for rate determination. The greater the activity level used the smaller is the overhead charge per unit of product and vice versa. The longer the time period used in determining rates the greater the equalizing effect upon product charges from period to period and vice versa. Attempts at uniformity of practice in this most significant area therefore may be directed first, toward a concept of the proper predetermined activity level and second, toward a reasonable time span for use in determining charging rates.

Predetermined overhead rates are usually based upon what is referred to as "normal capacity." This term seems to convey different meanings to different people, however; and so it is not helpful in classifying activity levels. Under this general heading can nevertheless be found four relatively well-known concepts; namely, (1) theoretical

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[1] J. M. Clark pointed out over thirty years ago that "if an accounting system could isolate those indirect expenses which remain constant as output varies, the result would not be the sort of thing suggested by the phrase: 'cost of idleness.' It would be, rather, the cost which is neither cost of production nor idleness but of readiness to produce, regardless whether there is any production or not." The term "cost of idleness," he suggests, implies "a quantity which would serve as an index of the efficiency with which management performs its task of eliminating idleness: something that would increase as idleness increased and vice versa." He points out that "evidently it is the unexploited portion of the constant costs which the accountant is bound to select in his quest for an index of managerial efficiency." J. Maurice Clark, Studies in the Economics of Overhead Costs, (Chicago: The University of Chicago Press, 1923), p. 251.

maximum capacity, (2) practical capacity, (3) average activity, and (4) expected activity.[1] The first two of these concepts are based upon physical capabilities to produce goods and the last two reflect relevance of experience and future expectations which are affected in part by physical capabilities to produce but primarily by ability to sell.

The theoretical maximum capacity is the level of activity which a plant might achieve over a short period of time with no interruptions. It is a 100% operating level in every sense of the term. It involves the continuous utilization of every machine and piece of equipment and complete utilization of buildings and grounds. The most ardent extremist in favor of segregation of "idle time costs" and minimization of product costs might logically favor such an activity level for determination of overhead charging rates. A rate so determined would surely provide an "idle time cost" figure indicative of unexploited constant costs. It would not be useful in itself as an attainable control figure, however, since there could be no hope of ever completely correcting the situation causing the unfavorable measurement. Such a rate would

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[1] The terms "average activity" and "expected activity" are used in preference to more common usage of "average capacity" and "expected capacity." Since these concepts are in no way indicative of maximum potential the use of the word "capacity" seems inappropriate.

The inclusion of expected activity as a basis for determination of "normal" burden rates may be subject to question if interpreted to apply to a short time period. However, even if the expected activity is determined on an annual basis, it will serve to "normalize" changes to monthly production.

in most cases produce product costs unrealistically low for income determination, pricing, or almost any other purpose. The theoretical maximum capacity is used as a matter of practice only as a point of departure in the calculation of other activity level concepts.

The desire to be more realistic and "practical" in the costing of production and the segregation of "costs of idleness" has led to a concept of "practical capacity." Here is, in a sense, another concept of maximum. It is a maximum level at which a plant might operate over an extended period of time. It is the level at which management would choose to operate if there were no problem of disposing of products advantageously. It is an activity level which is a function of physical plant facilities, but which is made practical as a possible base for overhead rate determination by the deduction of allowances for inevitable lost time for maintenance and repairs, unavoidable seasonal factors connected with production, machine failures, employee absences, set-up time, material shortages, and the like, as well as multi-shift and week-end and holiday idleness which are deemed by management to be in the best general interest of the organization, aside from problems of selling or otherwise disposing of products.

When overhead charging rates are determined based upon this "practical capacity" level of activity it is claimed that

> the unit cost so derived is, so far as the burden element is concerned, as nearly true cost of goods as it is possible to obtain

and that

> inventories of goods in process and of finished goods are not inflated by expenditures made to carry unused capacity in the form of idle buildings, machinery, and equipment.[1]

Burden rates are often based upon an "average activity" level as shown by past experience of the individual firm. The number of periods used in the determination of "average" differs greatly but a period of at least several years is usually considered. The theory seems to be that over the long haul such rates will assign all production costs to products and that there will be a general tendency for product costs to be equalized over a period of years.

The concept of "expected activity" differs from that of "average activity" mainly as a matter of time span. Whereas the "average activity" level rate changes only slightly from period to period as the result of the small effect of an additional period when merged with several periods, the "expected activity" is based upon expectations for each period standing alone and variations of level, and thus of the rates, are almost unlimited. The use of "expected activity" rates has found some favor because of its apparent compatibility with over-all budgetary control based on sales forecasts.

The problem is one of determining an appropriate degree of utilization of plant facilities which justifies the association of the total amount

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[1] C. F. Schlatter, Cost Accounting, (New York: John Wiley & Sons, Inc., 1947), p. 480.

of fixed production overhead with products produced. Stated differently as a question: what is the production level below which a certain portion of fixed production costs should be immediately matched against revenues? Since theoretical capacity is not attainable for any extended period of time, this basis may be ruled out as a practical procedure.

Those who advocate a practical capacity level related to physical facilities as a basis for charging of fixed production overhead implicitly hold that costs of facilities acquired (including salaried personnel) are entirely chargeable to products only if the practical maximum benefit is obtained from such outlays for each time period. As a result it becomes virtually inevitable that some of the costs resulting from wholly rational business decisions to acquire physical facilities or additional supervisory employees by-pass the product cost classification. This presents a questionable area of product costing for income determination purposes.

Morton Backer states that there are serious disadvantages

> to the use of the plant capacity as the basis for the establishment of normal overhead rates. Plant capacity is primarily physical in that it embraces the confines of the factory and gives no consideration to potential sales volume. Furthermore, this method of applying factory burden does not regard the existence of chronic overcapacity, particularly during periods of economic recession, as a factor to be reckoned with in the computation of product costs. The use of normal plant capacity also tends to impair the effectiveness of matching costs with revenue for the purposes of income determination, since by treating idle capacity as a loss it limits the amount of overhead to be assigned to products. It would appear, therefore, that normal capacity should be based not only on productive capacity but also on potential sales volume. [1]

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[1] Morton Backer, "Determination and Measurement of Business

It is interesting to examine this problem using some assumed circumstances. If, for example, the purchase of a machine to be used to produce a new part or product is being contemplated, a significant consideration involves the expected utilization of the acquisition. Will the machine, if acquired, be used enough to justify additional costs in the form of depreciation, taxes, insurance, maintenance, etc. ? Will the cost of owning and operating the machine, when spread over the units of production resulting from the machine's use provide costs per unit which are less than the price which would have to be paid to acquire similar parts or products from outsiders? If the machine is purchased many different types of costs will inevitably result and in a relatively fixed amount over the life span of the machine. A single item may be used to facilitate an example. The depreciation charge will be considered here.

Suppose that the machine costs $100,000 and may be expected to have an economic life of five years. Depreciation is to be computed on a straight-line-time basis, thus involving $20,000 per year. The machine will produce 100 units an hour. At practical capacity of 30 hours a week, or 1,560 hours a year, it will produce 156,000 units a year. The needs for this particular part or product to be produced by the new machine at the present time, and as far as can be foreseen, will average about 78,000 units per year. In the light of these data the

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Income by Accountants," Handbook of Modern Accounting Theory, Morton Backer, editor, (New York: Prentice-Hall, Inc., 1955), Chapter 8, p. 232.

machine is purchased. The question now is: Assuming production needs prove to be as anticipated, should all of the depreciation of the machine be associated with products or should only one-half of it be so associated as a result of a 50% utilization of the equipment? If more than 50% of the cost of the machine is charged to inventoriable parts or products, it may be argued that "cost of idleness" is being inventoried. If, on the other hand, only 50% of the cost of owning the machine is associated with parts or products produced, a paradox is implied that a justifiable business decision has been made to incur costs which are not in any way productive of benefits.

Another interesting situation is provided by the choosing between alternative purchases of equipment with different capacities to produce. If, for example, there were in addition to the machine already mentioned another available at a cost of $80,000 which would produce 60 units an hour, a rational decision would seem to be to purchase it in preference to the $100,000 machine. It would serve the needs just as well and depreciation cost would be smaller. Comparing the costing results, one finds that, by using a practical capacity rate, depreciation cost per unit of product would amount to about 13¢ if the $100,000 machine is used and slightly more than 17¢ if the $80,000 machine is used.[1] The choice

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[1] These depreciation costs per unit of product may be computed as follows:

	Machine A	Machine B
1. Original cost	$100,000	$80,000
2. Useful life	5 years	5 years

of the lower priced machine produces a cost per unit which is considerably higher than that applicable to the alternate choice. Within limits it seems that the larger the facility the lower will be the cost per product unit if the practical capacity concept is applied.

If in the above example planned utilization were used the depreciation cost per unit under the first alternative would be about 25.6¢ and under the other alternative it would be about 20.5¢, reflecting a smaller sacrifice made to produce a unit of product by the more appropriate means under the circumstances.[1] These comparative unit cost figures are not suggested for their primary significance in directing the decision to buy one machine as opposed to another, but rather to illustrate some degree of reasonableness to a planned utilization method of absorbing

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	Machine A	Machine B
3. Depreciation per year (line 1 divided by line 2)	$20,000	$16,000
4. Annual practical capacity for each machine in terms of product units	156,000	93,600
5. Depreciation cost per unit (line 3 divided by line 4)	12.8¢	17.1¢

[1] These depreciation costs per unit of product may be computed as follows:

	Machine A	Machine B
1. Original cost	$100,000	$80,000
2. Useful life	5 years	5 years
3. Depreciation per year (line 1 divided by line 2)	$20,000	$16,000
4. Planned annual utilization in terms of product units	78,000	78,000
5. Depreciation cost per unit (line 3 divided by line 4)	25.6¢	20.5¢

facility costs for income measurement purposes.[1]

It is not possible, in most circumstances, to exploit fully the service potential of all factors which give rise to fixed costs because of the indivisibility and specificity of services acquired and because of instability of market conditions. It is important that service factors which involve fixed costs be exploited to a maximum consistent with the general well-being of the enterprise, but it seems unreasonable to insist that full practical utilization is necessary to justify potential postponement (in inventories) of all related costs for matching against revenues. A planned or anticipated utilization of fixed cost factors at the time of acquisition provides a more appropriate base for use in the assignment of costs than does the practical capacity concept.

One phase of the problem of assigning fixed costs to products involves the consideration of the preceding step in the recording of costs. Most fixed costs of production are fixed because the accounting procedure makes them so. Depreciation, for example, is usually considered to be a fixed production cost. It is fixed rather than variable solely because of the general use of a straight-line-time basis of amortization of plant and equipment. Thus the justification for the accounting method which causes fixed costs to exist may require examination.

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[1] To justify the use of planned utilization it has been assumed that such utilization has taken into account all possible alternative uses for the machines. If planned utilization ignores possibilities for use of machines in the production of goods other than the usual products, it may result in concealing the cost of not seeking alternative uses.

Depreciation for accounting purposes is an orderly procedure (or a cost that is recorded as a result of an orderly procedure) by which the cost of long-lived physical properties is charged over the useful life of such properties. Accounting literature provides many and varied viewpoints as to the nature of depreciation as a physical phenomenon and as to appropriate related accounting techniques. In the past decade or two there has, however, been a general tendency for accountants to forsake the "decline in market value" approach in favor of the "assignment of a sunk cost to periods in proportion to relative benefits expired during each period to total expected benefits from the asset."[1]

In spite of the general recognition of the benefit doctrine as a theoretical guide for depreciation accounting, the straight-line apportionment on a time basis is widely used. In situations where production activities are carried on at a relatively constant level from month to month and year to year the results of the straight-line-time technique diverges only slightly from that dictated by a strict relative benefit procedure. In these cases the convenience of the straight-line-time method may justify the departure.

In many situations the utilization and the attending benefits derived from plant and equipment are spasmodic through time and serious violence is done to the relative benefit approach when straight-line-time

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[1]Carl T. Devine, "Asset Cost and Expiration," Handbook of Modern Accounting Theory, Morton Backer, editor, (New York: Prentice-Hall, Inc., 1955), Chapter 12, p. 342.

procedures are used. There appears to be little justification for making the same charge for depreciation of a machine in a period of complete idleness as in a period when a sizeable volume of products was processed by the machine.

It may be argued that the useful or economic life of the machine is not dependent upon the degree of use, that obsolescence is an ever-present factor, and that future available benefits to be derived from a machine are lesser after a period of idleness. Yet none of these observations refute the propriety of making depreciation charges in relationship to periodic benefits yielded. They are, for many considerations, of prime importance, but they are virtually irrelevant to the depreciation problem as it relates to income measurement. All three of these observations are related to a valuation viewpoint rather than one of cost apportionment. Depreciation is a procedure by which costs are associated with benefits. It is only of secondary significance that, since benefits occur through time, charges for expired asset costs become related to time periods. Obsolescence, which is a function primarily of technological progress, may certainly cause a diminution of market value of fixed assets but it need not change remaining benefits anticipated from a particular asset. Although maximum available benefits diminish as a function of time, such is not necessarily true of expected or planned benefits to a particular firm. As stated by Carl Devine:

> Matching of cost with periodic benefits (revenues) obviously does not require depreciation during slack periods for there are no

> services that register as revenues in those periods. It is clear that after a period of idleness the total available benefits are less than before, but so long as the total benefits expected by the firm have not decreased there seems to be no reason for insisting on capital consumption and a charge against either revenues or against income as an outright loss. [1]

Another writer states as follows:

> By clinging to this method (straight-line-time basis) of depreciation and disregarding the factor of utilization, the accountant may create serious distortions in income. Since the intended purpose of the acquired property was to perform services, actual services rendered represent the only theoretically justifiable basis for allocating property costs to revenue. [2]

Fixed production costs other than depreciation, such as property taxes, insurance, rent, and salaries are generally recorded as costs to be assigned either to products or directly to current revenues as they are paid, expired over a time basis, or accrued as a regular routine oblivious of relative benefits derived. If production costs such as these, as well as depreciation, were charged in accordance with relative benefits derived, periodic costs per production unit would be relatively stable and the problems of idle time and fixed cost assignments to products would be minimized as far as income determination is concerned.

This is perhaps too much to expect as a practical matter. Most accountants emphasize the matching process and income determination and the fact that the balance sheet includes only representations of

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[1] Ibid., p. 343.

[2] Backer, op. cit., p. 227.

unexpired costs rather than even approximations of economic values. Nevertheless, the balance sheet still holds some significance to some individuals as a "financial status" report. To the writer it does not seem wholly unreasonable to show on the left-hand side of a balance sheet an amount of, say $5,000, which represents one-half of the $10,000 salary paid to the production manager during the past year if during the past year the benefits derived from the production manager's services were as anticipated when the manager was employed.[1] There is of course a basic difference between this and the problem of depreciation in that the employee is free to leave his employer at any time. This is, however, a matter which relates to economic value rather than cost apportionment. The uncertainties of the future of any business and the overpowering zest for conservative accounting will doubtless restrain such a "radical" suggestion as this. Morton Backer writes that

> while it may be logical and justifiable for the income statement to contain a matching of actual costs with revenue, it should not be assumed that the unabsorbed costs represent appropriate balance sheet valuations.[2]

The recording of cost apportionment to time periods and the recognition of periodic decrement of economic values are not compatible.

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[1] Even if this idea may not be plausible for use in financial statements which reach the general public, it seems to be worth consideration for internal reporting purposes.

[2] Ibid., p. 229.

Accountants lean towards the former approach but they are not willing, at least at this time, to ignore the latter. In fact, areas might be noted where new accounting techniques are justified by accountants as providing approximations of realizable asset values. The use of declining balance depreciation provides at least one example of this.

How does this relative benefit idea relate to overhead cost assignments to products? If manufacturing costs such as depreciation and insurance are charged on a straight-line-time basis and others such as rent, salaries, and taxes are charged either as paid or as accrued on a time basis, recorded costs will reflect a considerable fixed tendency. If all production costs so recorded are assigned to products produced during each short time period, costs per unit will reflect wholly unreasonable variations. If "normal rates" of any kind are used to associate overhead costs with products, unabsorbed and/or overabsorbed balances are inevitable. If long-run anticipated utilization forms the basis for overhead rates and if this anticipation is not substantially changed, these balances may be interpreted to represent the divergence of recorded charges from those that would be made by the use of the relative benefit criterion. To charge or credit current revenues for such amounts is a denial of the criterion. To defer these amounts is to recognize the reasonableness of the criterion.

If manufacturing costs assigned to products include only an amount determined by multiplying the percentage of practical capacity attained

during the period by the planned manufacturing overhead for a period at practical capacity, an unreasonably large amount of manufacturing costs will by-pass product tracing in the determination of income. They will be matched against revenues by default rather than by logical association. If, however, the amount of manufacturing overhead costs associated with products is determined by long-run planned utilization of facilities, the periodic calculation will provide a better index of effectiveness of management's plans and a reasonable approximation of a representative portion of economic progress anticipated over a longer time interval.

If it were practical to determine and use a separate overhead rate for each facility or each commitment to a constant cost element, rates could be established on the basis of planned utilization over the expected life span of each commitment. This would be the degree of utilization which had been used to justify the commitment or decision to acquire the facility. At periodic intervals the anticipation of utilization could be recalculated. If there were no change in expectation of utilization there would be no reason to change the rates, and all underabsorbed or overabsorbed balances should be deferred from period to period. Neither would there be any reason for a change of the rates if there were a downward adjustment of anticipated utilization. However, in this case, an amount determined to be the product of the percentage reduction of anticipated utilization and the period's charges to

products using the original rate should be charged to current revenues as a reflection of post-decision unfavorable developments with regard to utilization of the facility. The difference between the fixed cost charge for the period and the sum of the charges to products and the direct charges to revenue should be deferred. If anticipated utilization were adjusted upwards there would be evidence of post-decision favorable developments or of benefits in excess of those anticipated when related decisions were made.[1]

From the standpoint of income measurement the problem of realization is now presented. The realization postulate would dictate that these benefits should be recognized only as sales are made. Thus an adjustment downward of the charging rates would appear to be warranted. New rates should reflect the newly determined expectation and underabsorbed or overabsorbed overhead balances should again be deferred from period to period. If then the expectations were readjusted

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[1] An interesting commentary on this same sort of reasoning may be found in a Memorandum on Costs in Relation to Output by C. Reinold Noyes, published in an appendix to Joel Dean's article on The Relation of Cost to Output for a Leather Belt Shop, Technical Paper Number 2, (New York: National Bureau of Economic Research, Inc., 1941). On page 63 he states: "Any costs which do not lead to products must be charged off as losses. If it is decided to include in the class, costs, any which run regardless of use of the factor--by reason solely of making it available--then during the time these factors are not in use, the costs must be accumulated as long as there is justifiable expectation that the factors will lead to product, and they must be charged to the product when there is product. . . . But if there is no such expectation or if the expectation eventually proves false, then the original and the accumulated costs, if any, must also be charged off as losses."

downward after the adjustment in the other direction the rates should be increased as long as they did not exceed the rates as determined at the time of the commitment decision.

This sort of reasoning presents the problem of whether or not adjustments should be made to prior periods based upon information available by hindsight. Theoretically such adjustments are surely appropriate; however, the decision as to whether they should be made or not depends on the materiality of the amounts involved and the practical inconvenience of recording such adjustments.

A procedure such as has been descirbed is hardly practical in most cases, yet it does provide a logical framework from which departures may be made knowingly. Overhead charging rates should be established for income determination purposes using the "long-term" planned utilization which is relevant to decisions to enter into fixed cost commitments. The time period used should approximate the average time period for which fixed commitments are made. In most industries such a period would surely involve at least three to five years. Underabsorbed or overabsorbed overhead balances should, as a general rule, be deferred until there is convincing evidence that long-run anticipations have changed. When such evidence is recognized the deferred overhead (debit or credit) should be adjusted to reflect the balance that would have been produced by the use of the newly determined expected utilization.

Standard Costing—Efficiency Standards

Although the concepts are not entirely unrelated, a distinction is usually made between economies resulting from maximizing productivity of facilities used and those resulting from maximizing the utilization of facilities available. The degree to which the former is attained is generally referred to as a measure of efficiency.

The question now arises as to whether efficiency standards in terms of production overhead costs should be used in product costing for income measurement. Should only budgeted amounts of overhead based upon a reasonably high level of attainable efficiency be associated with products? This problem is little different basically from the general problem as to whether standard or "actual" costs are suitable bases for costing products and carrying inventory. The attitude of professional accountants some sixteen years ago was summed up as follows:

> Standard costs may not be regarded as an alternative basis of determining the amount at which inventory should be carried unless they conform, or by adjustments are made to conform, to the appropriate amount of the inventory determined on an acceptable basis. [1]

A more general and enthusiastic acceptance of standard costs in the formal accounts as means of control and the increased use of standard costs for planning purposes have perhaps caused some change

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[1] Research Department of the American Institute of Accountants, "Inventories," Journal of Accountancy, (October, 1940), p. 330.

of this attitude, but professional accountants are still conscious of the need for examination of standards when used for inventory purposes to determine their proximity to "actual" historical costs. A more recent authoritative statement indicates that

> standard costs are acceptable if adjusted at reasonable intervals to reflect current conditions so that at the balance sheet date standard costs reasonably approximate costs computed under one of the recognized bases. In such cases descriptive language should be used which will express this relationship as for instance "approximate costs determined on the first-in, first-out basis," or, if it is desired to mention standard costs, "at standard costs, approximating average costs."[1]

It is not possible to give a yes or no answer to the problem of whether or not standards should be used for income determination since there is no general objective concept as to what standards represent. They are sometimes developed primarily for motivation of employees, sometimes to be used as bases for payment of premium or bonus remuneration to employees, sometimes for budgetary planning, and at other times purely as control benchmarks. Also, even though the term "scientific" is often used as a descriptive adjective relating to standards, surely it must be recognized that, at least for overhead costs, there is inevitably a degree of subjectivity in the establishment of standards directed at any one particular use. Standards developed for different purposes and involving various degrees of subjectivity cannot

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[1]Committee on Accounting Procedure of the American Institute of Accountants, Bulletin Number 43, Restatement and Revision of Accounting Research Bulletins, 1953, p. 30.

apply equally well to the problem of income determination or any other area.

There is little to be gained by insisting that standards provide the only "real" cost of products. Standards and budgets are highly useful for many purposes, but they are artificial and their determination is subjective in nature. They may or may not be suitable for product costing for income measurement. As was reasoned for the assignment of fixed overheads, the plan or intent of management is significant.[1] If standards for overhead costs are established at planned or anticipated efficiency, rather than at an idealistic level or at an incentive "bogey," they should suffice for income calculations. If actual overhead costs exceed budgeted amounts for activity levels attained and unfavorable budget variances are produced, these amounts need not be associated with products since they represent costs which were not effective in producing goods in accordance with a reasonable plan. If, on the other hand, efficiencies as shown by overhead costs exceed anticipation and favorable credit variances are produced, the realization postulate again would dictate adjustments to cost of sales and inventory figures to prevent premature income recognition.

A concept of an efficiency time span is necessary to direct practice with regard to charging-off or deferring of budget variances. The

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[1] For particular emphasis upon "intent" as the key to the matching of cost of "service-output" with revenue produced, reference is made to A. C. Littleton's "Concepts of Income Underlying Accounting," The Accounting Review, (March, 1937), pp. 13-21.

length of such a time span depends in part upon the degree of precision used for short-period accounting purposes. If monthly accounting for costs is reasonably meticulous and coincides with budget allotment procedures, a month may be used as the efficiency time span and budget and/or efficiency variances may be dealt with at the end of each month. In most situations it would seem, however, that accounting routines would not be meticulous enough and budgetary allotment procedures would not be so precise as to justify such a short period for reckoning with variances. Six-month or year intervals are usually justified so that monthly variations of overhead costs from standards resulting from deviations from anticipated efficiencies should be deferred rather than charged to current revenues. This time span of planned efficiency should not be limited arbitrarily even to one year, but it is almost inevitably shorter than the commitment period referred to earlier with reference to fixed cost items.

Aside from the propriety of the use of standard overheads for total assignment to products it should be noted that they are useful in the apportionment of costs which are at least partially joint or common to various products. When inventories of the different products fluctuate in varied patterns, standards serve to refine the income computation.

Inventory Valuation

It was pointed out in Chapter III that the accountant's concept of

net income is one of matching costs against revenues, with the latter being measured in terms of discrete events--usually sales transactions. Implementing this concept involves the viewing of inventories as residual costs which are postponed in their matching against revenues. Thus accountants do not attempt to show product inventories at amounts that approximate realizable economic values or worth. If the matching of costs against revenues is properly accomplished, inventories are determined. Nevertheless, there is indicated throughout the literature on product inventories a concern for their relationship with realizable values.

The association of all overhead costs of an accounting period with goods produced during the same period ignores all relevance of this relationship. It may, in many cases, produce unit cost figures far in excess of market values even under circumstances in which such production is based on completely rational business decisions. A firm may, for example, be operating for a limited period of time at an unusually low level in order to allow inventories to diminish to desired quantities before resuming a level more nearly in accord with long-run demand for the product. Goods produced during this slack period of production can hardly be considered more "costly" than similar goods produced in another period when there is no attempt to allow for run-off of inventories. The buying public can hardly be expected to differentiate between goods produced during these two periods and pay

relatively higher prices for those produced during the period of low production volume. Although differing operating conditions prevailed during the two periods the economic significance of the products yielded is not accordingly different. This recognition leads one toward a product cost concept which is limited to at least no more than a portion of facility costs which would be the pro rata share assignable to products in a period when production activity is at a level which is at least close to normal or average over the long run.

The possibility of gross undervaluation of inventories is to be found in proposals to limit product costs to direct material and direct labor or to those costs which tend to vary with production levels. Assuming reasonable prudence of the businessman in his making of fixed cost commitments, practices such as these will generally state inventories far below their market value. As stated by Charles E. Johnson:

> In reporting progress over time . . . we should keep our methods of asset valuation firmly rooted in the idea that an asset represents a future service potential. . . . If the essence of an asset is that it represents service potential to the company, there is no logical reason which can be deduced why that service potential is best or even adequately represented by only that portion of past investment which will vary with volume of output. [1]

Thus it seems that, recognizing the accountant's departure from the economist's concept of income with its valuations of assets in terms of discounted future returns, the inclusion of all production costs based

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[1] Charles E. Johnson, "Inventory Valuation--The Accountant's Achilles Heel," The Accounting Review, (January, 1954), p. 20.

upon long-run anticipated activity levels, as suggested earlier in this chapter, has considerable merit as an "inventory valuation" base.

Income Tax Considerations

The all-important effects of income taxes upon business decisions and accounting practices is generally well known, but not always understood. Overhead costing of products is significant in this area and it would be remiss to ignore it in a discussion of this sort. Care should be taken to prevent income tax acceptability from being the sole criterion of accounting methods, but in order to serve business and society generally the accountant must be aware of those procedures which are acceptable for tax purposes and the effects of various procedures upon the taxpayer's tax liability.

The effects of various associations of overhead costs with product units upon net income calculations have been reviewed in Chapter III. It has been noted that the use of different overhead costing methods causes reported net income to vary in accordance with the relative changes of overhead cost content of inventories. The method producing the largest increase or the smallest decrease in overhead cost content of inventories produces the greatest income result and therefore causes the greatest tax liability and vice versa. Since each concept of overhead costing necessarily increases or decreases overhead cost content of inventories in an amount directly proportionate to physical change of inventories, and since over the long run inventories must increase

and decrease in the same absolute quantity, the problem of income tax effects relates only to the timing of income recognition and not to the amount of income reported for tax purposes over an extended time period.[1] If no attempt is made to predict changes in tax rates, it would seem that income tax advantages are possible only in periods of change of product costing methods or as a result of relative stabilization of periodic income.[2]

The Internal Revenue Code does not specifically state how overhead costs must be associated with products for income tax reporting. It does, however, require that inventories shall be on a basis to conform to the best accounting practice in the trade or business and to most clearly reflect income.[3] This allows a wide latitude of practice and places at least some responsibility upon the accountant to adopt practices which "most clearly reflect income."

In general, the approach of the income tax law and its administration involves an insistence upon consistency from period to period in

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[1]This "extended time period" may be of infinite duration. The tax saving in the period of change of product costing method, although not repeated in succeeding years, may be measured in succeeding years in terms of reasonable interest on the amount of the tax saving.

[2]The tax advantage of stabilizing periodic income is limited by a two-year carry back provision and a five-year carry forward provision of the Internal Revenue Code.

[3]Internal Revenue Code of 1954, Section 471, (New York: Prentice-Hall, Inc., 1954).

order to forestall willful opportunism in the timing of income recognition rather than an insistence upon any specific concept of product cost. Thus it is conceivable, and perhaps likely, that full absorption costing or direct costing, standard costing or "actual" costing, or some variant of these concepts would be accepted for tax purposes if applied consistently.[1] The writer and accountants generally are aware of situations in which certain manufacturing costs, such as depreciation and taxes, are allowed to by-pass product inventories, with the acquiescence of the Commissioner when consistently followed.

There is no specific provision in the Internal Revenue Code concerning change of practice relating to the inclusion of overhead costs in product inventory. However, the general emphasis upon consistency and the requirement of permission of the Commissioner for change from first-in, first-out to last-in, first-out, for example, seem to indicate that permission for change from one method of overhead costing of products to another method is required. Yet many changes of this sort are so difficult to define and of such differing degrees of significance that a policy cannot be well delineated. Many companies have undoubtedly changed their practices in this area by small installments

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[1] Oswald Nielson reports that "The Karr Engineering Company has always valued its inventory at direct cost . . . for income tax purposes" and that the Bureau of Internal Revenue has reviewed and accepted the procedure "because it has been consistently used." "How Direct Costing Works Internally and Externally for a Small Manufacturer," Journal of Accountancy, (August, 1953), p. 204.

without having it questioned for tax purposes. Others have requested permission to change from the method used in the past to a direct costing procedure with varying results.[1]

If the taxpayer company were allowed, without penalty, to change from one method of overhead costing to another which excluded from product costs certain elements of production overhead which had previously been included, the result would be a net tax saving in the period of change. If the anticipated tax saving were substantial, and if the Internal Revenue Service were aware of the change of method, however, it is doubtful that the change would be allowed. Since there is no repeating advantage after the change has been made and since the advantage even in the period of change may not be allowed, this income tax consequence of overhead costing is of little practical significance.

In periods when excess profits taxes are being assessed, or for a company which experiences wide swings of profit and loss cycles, the stabilizing of reported income becomes an important factor from the income tax standpoint. The overhead costing method which most nearly assigns the total amount of production overhead to products over a long time period has a tendency to dampen fluctuations of reported profits and thus is the most advantageous during such periods and for

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[1]Gould L. Harris, "Controlling Overhead Costs," Industrial Accountants' Handbook, Wyman P. Fiske and John A. Beckett, editors, (New York: Prentice-Hall, Inc., 1954), Chapter 7, p. 236.

such companies.[1] This is especially true if most underabsorbed and overabsorbed balances are deferred from period to period as has been suggested earlier. Such a procedure would undoubtedly need more support from the accounting profession than it now has to gain acceptance for tax purposes, but it does not seem wholly unreasonable to the writer.

One other observation may be worth making with reference to income tax effects of overhead costing. Considering the two extremes of complete absorption costing and prime costing, the former will result in the greater net income when inventories are being increased and the latter will result in the greater net income when inventories are being decreased. If, as is likely to be the case, inventories (including work in process) are being increased during periods of expansion when there is urgent need for working capital, the prime costing method and those that tend to approach it in their effects may have some advantage. As inventories diminish in periods when business activity is receding the need for working capital may not be so great and the relatively disadvantageous tax position would not be so significant. Even here, however, the lag in tax payment dates and the uncertainty of the timing of business cycle fluctuations may almost nullify this consideration.

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[1] This proposition is based, first, upon the observation that direct costing causes reported profit to fluctuate in direct relationship to sales level without regard for production level whereas absorption costing causes reported profits to fluctuation in direct relationship to both sales levels and production levels; second, upon the tendency for sales levels to fluctuate through a wider range than production levels; and third, upon the tendency for sales and production levels to change sympathetically.

Conservatism and Consistency

Before leaving the subject of overhead costing and its relationship to income measurement some comments on the often-used criteria of conservatism and consistency may be in order. Prior to the past twenty or twenty-five years, accountants, investors, and perhaps businessmen, generally, laid much stress on asset valuations and the importance of "keeping on the safe side" by stating assets at conservative figures. This attitude gained considerable emphasis as a result of the great depression of 1929 and ensuing years with severe and abrupt diminution of asset values. When, during the late 1930's, accountants came more and more to stress the importance of income determination, their emphasis upon conservatism took over the adage of "recognition of all possible losses and anticipation of no gains." Now accountants generally recognize the impossibility of being continually and repeatedly conservative for both income statement and balance sheet purposes; for to minimize a valuation of an inventory or a fixed facility necessarily tends to increase reported profitability for the following period or periods. The old criterion of conservatism nevertheless still creeps in at frequent intervals to justify accounting treatments, narrowly interpreted.

More important than these observations is the need for accountants to recognize that the doctrine of conservatism is not particularly useful to the accounting profession nor to business and society in general.

Accountants should strive to approximate to the best of their abilities, drawing upon the techniques at their command, a reasonable net income figure for a company for a particular period of time. Their objective should be neither conservatism nor its opposite but reasonable representations under the existing circumstances. It seems to the writer somewhat degrading to the profession to rely on conservatism, by default, to justify representations of income. If for income determination purposes it is reasonable to include in inventories what some cost-conscious individuals might appropriately call "costs of idleness," the accountant should not hesitate to do so for fear of criticism on grounds of lack of conservatism. The cirterion of conservatism should never be allowed to replace reason, logic, and good common sense for either the accountant or businessmen in general.

Another traditional criterion of acceptable accounting for income is that of consistency. It has been given emphasis by the tax law and administration, and professional accountants have deemed it so important as to warrant specific comment in the standard opinion paragraph of the short form audit report. This criterion has more substance than does that of conservatism. Without a degree of consistency of accounting methods, representations lose their comparability--a factor of major importance--and the possibility of willful manipulations of financial data becomes considerable.

Nevertheless there is a real danger in the blind following of consistent procedures. To apply consistently procedures which are

basically faulty is not virtuous and accountants should take stock often to see that they are not led into tacit approval of concepts of product costs based upon the relatively smaller damage to be done if they are consistently used.

There is also a possibility for misinterpretation of the intent of the rule of consistency. In the area of overhead costing the writer has noted a situation in which overhead charging rates have been used without change for the past five years. During the five-year period the company has significantly expanded its facilities. Overhead costs have increased substantially without a comparable increase in direct labor costs which are being used as the basis for overhead application. When overhead rates were established they served to assign the approximate amount of overhead being incurred. Now, five years later, underabsorbed overhead balances of as much as 25% of production overhead incurred are being charged to current revenues. Has this company followed a consistent accounting practice? The company controller feels that its tax returns are accepted and that its professional accountants go along with the practice, at least in part, because it has been consistent. Surely this is a case of gross inconsistency. To change from approximately complete absorption of fixed overheads to something less than 75% absorption over a five-year period is not consistent. The consistent use of the same burden rates does not amount to consistent accounting practice nor does it produce consistent results.

In this and other areas of accounting care must be taken not to confuse consistent application of accounting principles and concepts with the consistent use of tools which, under differing circumstances, produce inconsistent and unreasonable results.

Summary and Conclusions

A review of various overhead costing methods and of their theoretical justifications leads the writer to conclude for short-term income measurement (1) that there is no rational basis for the by-passing of the product cost category by all production overhead costs, (2) that there are often circumstances which make it inappropriate to assign all recorded production overhead costs as product costs during a period of a year or less, (3) that behavior patterns of certain overhead costs are not necessarily relevant to the problem of tracing to inventoriable product units, and that therefore the direct costing method is not acceptable, and (4) that long-run planned expectation of plant utilization and operating efficiency provide the most appropriate bases for determination of overhead charging rates.

In view of the demonstrated interest of the accounting profession as represented by the American Institute of Accountants in a degée of uniformity in periodic income reporting, it seems that greater attention should be given to the problem of overhead costing of products. The Committee on Accounting Procedure might well consider taking a definite position in favor of the general association of fixed production

overhead costs, including depreciation and taxes, with product units and the use of long-run planned utilization and efficiency as the bases for overhead charging rates with reasonable adjustments to and deferments of production overhead cost balances.

Objections to the latter of these suggestions may be anticipated. The use of planned utilization and efficiency involves certainly a subjective determination, but it is basically sound and to encourage business management to use reasonable methods based upon their own subjective determinations is surely better than doing nothing at all. Also the deferment of overhead cost balances could be expected to meet resistence from those who still cling to the valuation approach to the balance sheet and attempt with some futility to make relative periodic valuations of resources compatible with cost apportionment for matching of costs and revenues. The profession and business men generally are perhaps not ready to accept the deferment of overhead cost balances, but it too seems fundamentally sound.

CHAPTER V

OVERHEAD COSTS OF PRODUCTS--
FORECASTING AND PLANNING
NET INCOME

The Need for Long-term and Short-term Profit Forecasts

Managers of private enterprises and their accountants attach much significance to potential and "actual" profits[1] or net income as determinants of operational decisions. Economists have, historically, emphasized the theory of profit maximization as a prime director of economic activity. Although more recently economists have pointed out examples of serious defects of the profit maximization theory, they still recognize the profit motive to be perhaps the most important single force which directs managerial action.

Decisions relating to problems such as product diversification, plant expansion, and industrial integration are based upon potential long-run profitability. The determination of such potential involves

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[1] Throughout this chapter the terms "profit" and "net income" are used synonomously, as is somewhat customary in accounting literature. The concept, as here used, and as generally used for accounting and financial purposes, is more inclusive than the economist's definition of profits. It includes, in most situations, elements of wages, interest, and rent, as well as "pure profits" in the economic sense.

forecasting of long-run economic conditions as well as other factors relating more specifically to the individual firm, such as consumer demands and preferences, changes in population and its stratification, cost magnitudes and patterns, competitive pressures, the degree of direct or indirect government intervention, and the like. The accountant may be of some assistance in considering these matters but alternative accounting procedures used in the calculation of net income have little if any relevance.

Other decisions of a shorter-run variety relating to such matters as quarterly dividend declarations, seasonal financing, the precise timing of issuances of stock for additional permanent capital, and the meeting of income tax obligations depend substantially upon reported short-run profitability. Here accounting procedures take on greater significance. In order to control and plan short-run business activities, short-run profits must be planned and reported in a manner which has meaning to management.

Management must be able to forecast and plan for short-term profits with a knowledge of effects upon net income of various courses of action and of various changing phenomena on the economic scene. Specifically, changes in sales volume, selling prices, product mix, input factor prices, production levels, production efficiencies, and cost patterns must be interpreted by business managers in terms of effects upon net income. Such interpretations are possible only if

detailed data relating to historical operations are available, if a detailed plan or forecast of profit is made and kept current, and if current operating reports are made comparable to the profit plan so that meaningful relationships may be observed.

Break-even Analysis and Forecasts of Profits

Concepts and procedures of profit planning or forecasting are varied in practice, but one of the most used techniques is that known as break-even analysis.[1] This type of analysis treats expenses and revenues, and therefore profits, as functions of output. If both expenses and revenues are charted for a range of possible output, a point at which there will be neither profit nor loss is provided by the intersection of the two lines and, even more significantly, profit or loss results may be visualized for any level of output within the range charted.

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[1] One of the most enthusiastic advocates of this technique is Fred V. Gardner. He has written much on the subject—his most recent substantial work being Profit Management and Control, (New York: McGraw-Hill Book Company, Inc., 1955). The title of this work does not properly imply the emphasis which the author gives to break-even type of analyses. With the exception of about 20 pages of introductory material practically the entire work of some 282 pages is devoted to this type of analysis.

Joel Dean suggests three approaches to profit forecasting; namely, spot projections, break-even analysis, and environmental analysis. He recognizes that these methods are not mutually exclusive but usually serve to supplement one another in actual practice. He treats the break-even analysis in some detail, giving almost only passing reference to the other two approaches. Joel Dean, Managerial Economics, (New York: Prentice-Hall, Inc., 1951), pp. 325-345.

Such an arrangement makes it possible to observe expected effects upon short-run profit of a change in prices which would change the slope of the revenue line, a change in production efficiency which would change the level of the expense line, a change from variable to fixed patterns of expenses or vice versa to produce a change in the slope of the expense line, and other changing phenomena, as well as changes in output.[1]

The Problem of Harmonizing Product Costing and Break-even Analysis

Conventional product costing which allocates a portion of fixed production costs to products and charges any excess to the current period's revenues presents a problem in the effective use of short-term break-even analysis. Reported profits under conventional product costing are made to reflect changes in production levels and if such changes do not coincide with sales levels comparability of reported profits and

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[1] It should be recognized that there are significant limitations of this type of analysis. The most imposing ones are based upon the static rather than dynamic nature of the analysis and the practical difficulty of determining expenses and revenues as functions solely of output. Joel Dean summarizes his discussion of break-even analytical techniques by stating that "the main contribution of break-even analyses is a dramatic, graphic comparison of several functional relationships on one chart (i.e., the short-run relationships of costs, revenue, and profit to activity rate). Its usefulness for any management problem depends on the accuracy and relevance of these several relationships." Joel Dean, "Methods and Potentialities of Break-even Analysis," Studies in Costing, David Solomons, editor, (London: Sweet & Maxwell, Ltd., 1952), p. 250. Reprinted from The Australian Accountant, Vol. XXI, Nos. 10 and 11, October and November, 1951.

planned or forecasted profits is lost, or at least complicated. As has been stated, break-even profit analysis is based on the functional relationship between profits and output. It allows only one measure of output--that usually being sales--whereas conventional accounting, in effect, recognizes both production and sales. Thus a dilemma is presented.

Although the traditional practice of charging volume variances to current period's revenues has not been subscribed to whole-heartedly in the previous chapter, its general use seems to justify some investigation of the situation which it creates. Also, enthusiasm for the direct costing procedure and its advocates' concern for management's difficulty in understanding profit fluctuations which do not harmonize with fluctuations in sales give some current relevance to the problem.

An important advantage of direct costing is claimed to be the facility which it gives to effective profit forecasting or planning. Advocates of the plan are able to illustrate that by the direct costing approach reported profits may be easily and simply compared with profits planned by a conventional break-even type of analysis. They are able to show that by refusing to assign fixed production costs to product units the level of production does not affect reported income and thus does not frustrate management in its desire to plan and observe profitability and its relationship to sales revenue. Many of the more ardent proponents of the procedure are, in fact, advocating a change in the conventional concept of income determination to one which harmonizes with usual break-even type of profit planning techniques.

Even those who criticize direct costing as a method of income determination must surely recognize the problems of effective profit forecasting based on conventional break-even analysis and profit determination by a method which allows production levels to affect the calculation of historical net income. The problem is illustrated in the following paragraphs.

Illustration of the Relationship Between Product Costing and Conventional Break-even Analysis

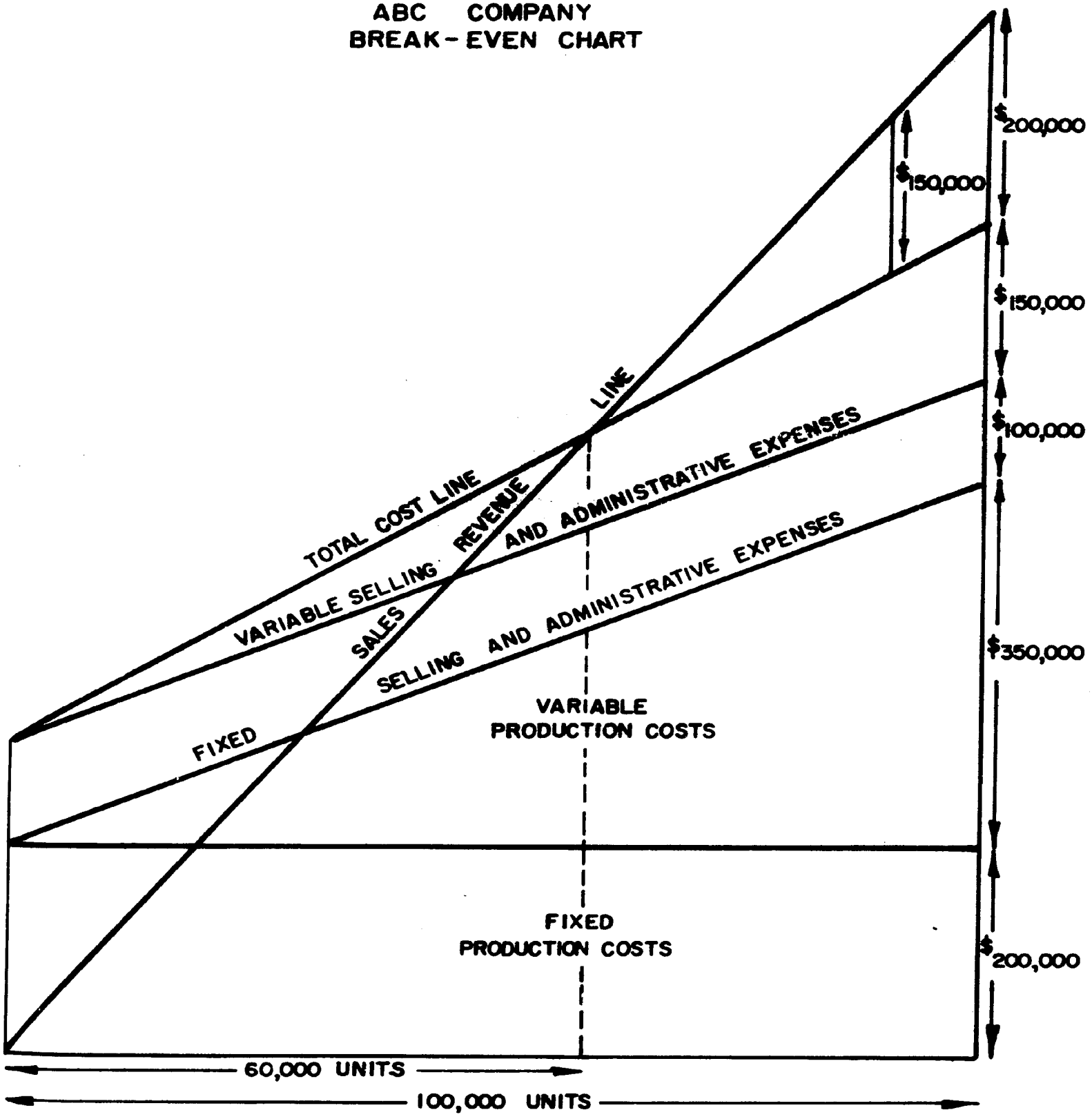
Profit forecasting and planning for the ABC Company involves the segregation of fixed and variable components of production, selling, and administration costs and the use of a break-even type of chart to show the forecasted profit for various sales volume levels. This chart for the year 195_ is as shown in Figure 9.

This chart shows management that its business should break-even if approximately 60,000 units are sold[1] and that if sales reach a peak of 100,000 units profit should be $200,000. In addition the chart shows the expected profit or loss at any volume to be equal to the measure of the vertical distance between the sales revenue line and the total cost line.

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[1] This implies that a single product is being processed and sold. If there are many products involved, which is the usual case, a product mix must be assumed and the horizontal axis of the diagram is then measured in dollars rather than product units. Variable costs are then represented as a percentage of sales based on the assumed mix of products rather than as an amount per product unit.

FIGURE 9


ABC COMPANY
BREAK-EVEN CHART
$200,000
$150,000
$150,000
$100,000
$350,000
$200,000
TOTAL COST LINE
VARIABLE SELLING AND ADMINISTRATIVE EXPENSES
SALES REVENUE LINE
SELLING AND ADMINISTRATIVE EXPENSES
FIXED
VARIABLE PRODUCTION COSTS
FIXED PRODUCTION COSTS
60,000 UNITS
100,000 UNITS

During the year the pace of sales volume is observed closely and projections of net income are made for the current fiscal year. At the end of the year management is given the report as shown in Figure 10.

Judging from the level of sales and advance knowledge of slight increases in market prices management might have expected a profit of something in excess of $150,000 as shown in Figure 9. When asked to explain the $29,000 discrepancy between planned and reported profits the accountant may appropriately suggest the following:

1. Average sales price was $10. 13-1/3 instead of the planned price of $10. 00. This accounted for more profit than planned in the amount of (90,000 units @ 13-1/3¢)	$12,000
2. Actual production costs exceeded budgeted production costs. The amount is shown by cost variances on the income statement. This accounted for less profits than planned in the amount of ($4,000 plus $6,000 plus $5,000)	(15,000)
3. Selling and administration expenses exceeded the budgeted amount. This accounted for less profit than planned in the amount of ($245,000 minus $235,000)	(10,000)
4. Production fell short of sales by 8,000 units. Fixed production costs associated with this 8,000 units @ $2 per unit accounted for less profit than planned in the amount of	(16,000)
Net discrepancy	$29,000

Figure 10

ABC Company

Income Statement Using Absorption Costing
for Year Ended December 31, 195_

Sales (90,000 units)		$912,000
Cost of sales:		
Beginning inventory of finished goods (30,000 units @ standard production cost)	$165,000	
Cost of goods finished during the year (82,000 units @ standard production cost)	451,000	
Cost of goods available for sale	$616,000	
Ending inventory of finished goods (22,000 units @ standard production cost)	121,000	
Cost of sales		495,000
Gross manufacturing margin		$417,000
Production cost and volume variances:		
Material cost--Unfavorable	$ 4,000	
Labor cost--Unfavorable	6,000	
Burden cost--Unfavorable	5,000	
Burden volume--Unfavorable	36,000	
Total		51,000
Net manufacturing margin		$366,000
Selling and administration expenses		245,000
Net income		$121,000

The first three factors contributing to the discrepancy between planned profits and reported profits are surely understandable. However, management might logically question the reason for leaving the $36,000 volume variance out of the reconciliation or for apparently replacing it with a $16,000 amount. Such a query can only be answered by reference to item 4 and its significance to the calculation. But this is the point at which a real problem arises. If income were decreased by $16,000 as a result of production falling short of sales the cost accountant may very well be expected to prescribe a remedy in terms of increasing production or decreasing sales in the future. The first of these two alternatives is likely to appear questionable to management personnel who are doubtless convinced that income is the result of selling goods at prices in excess of their costs rather than by producing with reckless abandon. The second alternative is hardly a reasonable solution.

If, on the other hand, the income statement were prepared using the direct costing approach it would appear as in Figure 11. Now the $13,000 difference between reported and planned profit may be explained readily. Excessive production costs of $15,000 plus excessive selling and administration expenses of $10,000 less the $12,000 addition to profit caused by an unanticipated increase in selling prices accounts for the $13,000 deficiency of reported profits.

Figure 11

ABC Company

Income Statement Using Direct Costing
for Year Ended December 31, 195_

Sales (90,000 units)		$912,000
Cost of sales (90,000 units @ standard variable production cost)		315,000
Gross manufacturing margin		$597,000
Production variances:		
Material cost	$ 4,000	
Labor cost	6,000	
Burden cost	5,000	
Total	$ 15,000	
Fixed production costs	200,000	215,000
Net manufacturing margin		$382,000
Selling and administration expense		245,000
Net income		$137,000

The Appeal of "Direct Costing"

Conventional break-even type analysis relates profits to a single measure of output, implicitly assuming equality of production and sales. No serious problems arise in the relating of reported income and expected income if production and sales levels remain the same no matter whether reported income is based on direct costing procedures or on a type of absorption costing. If, however, product inventories change during an accounting period net income determined by the use of direct costing is readily comparable with planned income, but that resulting from the use of absorption costing must be reconciled by use of a factor such as item 4 on page 160. This factor is the product of the number of units of inventory change and the standard fixed production cost per unit or the change in the fixed cost content of product inventories. It is not subject to a completely satisfying explanation under many circumstances. Thus accountants must face up to a weakness either in profit forecasting and planning techniques involving a break-even analysis or in conventional income determination based on some variety of absorption costing.

There is an obvious temptation for accountants and managers to yield to the simplicity of the direct costing approach to income determination, if only to obviate difficult explanations and apparent inconsistencies of profit forecasting techniques and historical profit computations. Yet this latter inconsistency may be caused by faulty profit

forecasting techniques rather than faulty income determination. It is indeed difficult to justify the fact that lack of comparability of forecasted and conventionally reported income has, almost without exception, led to a review of income determination methods rather than income forecasting methods.

As has been pointed out in an earlier chapter, professional accountants have not accepted the direct costing approach to short-term income calculation. If they are to persist in their insistence upon inclusion of effective fixed costs in the cost of product units (and the author feels that they should) it is reasonable that they assist in devising profit forecasting techniques which are consistent with their concept of short-term income calculation.

Using the direct costing method, enthusiastic profit planners and forecasters show simply that profits will be the difference between sales revenues and the sum of the cost of products sold (including only variable production costs), fixed production costs, and selling and administration expenses. This harmonizes with the plan diagramed in Figure 9 on page 159.

Absorption Costing and a Flexible Profit Plan

A flexible profit plan under an absorption costing method need be only slightly more involved. The calculation of expected profit changes only in that fixed production costs are replaced by volume variances and a standard amount of fixed production cost is included in product

unit costs. Conceptually the only added complication is that caused by a changing volume variance as opposed to a constant amount of fixed production costs. This complication may appear, however, to take on greater significance when it is noted that conventional diagrammatic break-even analysis does not lend itself to a varying amount of volume variance.

The income statement for the ABC Company shown in Figure 10 is based upon an absorption costing procedure using 100,000 units of product as the "normal" activity level with volume variances being charged to current revenues. A diagrammatic conception of a flexible profit forecast to coincide with these procedures may be set up as shown in Figures 12 and 13 on page 167.

The diagram in Figure 12 shows a flexible budget of selling and administration costs and gross margins for various sales levels. The gross margins in this case are the product of the number of units sold and the planned $4.50 margin per unit—the $4.50 being the difference between the planned selling price of $10.00 and the standard manufacturing cost per unit of $5.50. The vertical distance between the total selling and administration expense line AC and the gross margin line OB shows potential profit or loss.

In Figure 13, line FG shows production costs as a function of production level[1] with production level scaled on the horizontal line OJ.

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[1] Cost functions are shown in the diagrams of this chapter to be linear. This assumption, although subject to some error, is usually

FIGURE 12

NON- PRODUCTION COSTS AND
GROSS MARGIN PLAN

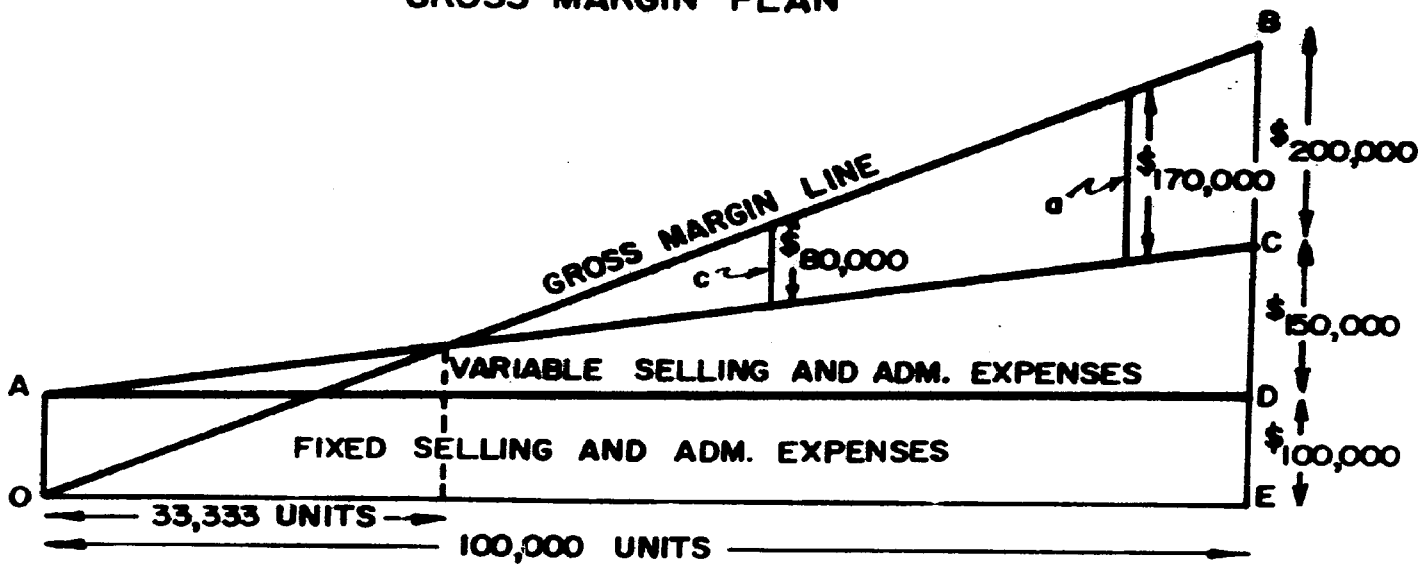
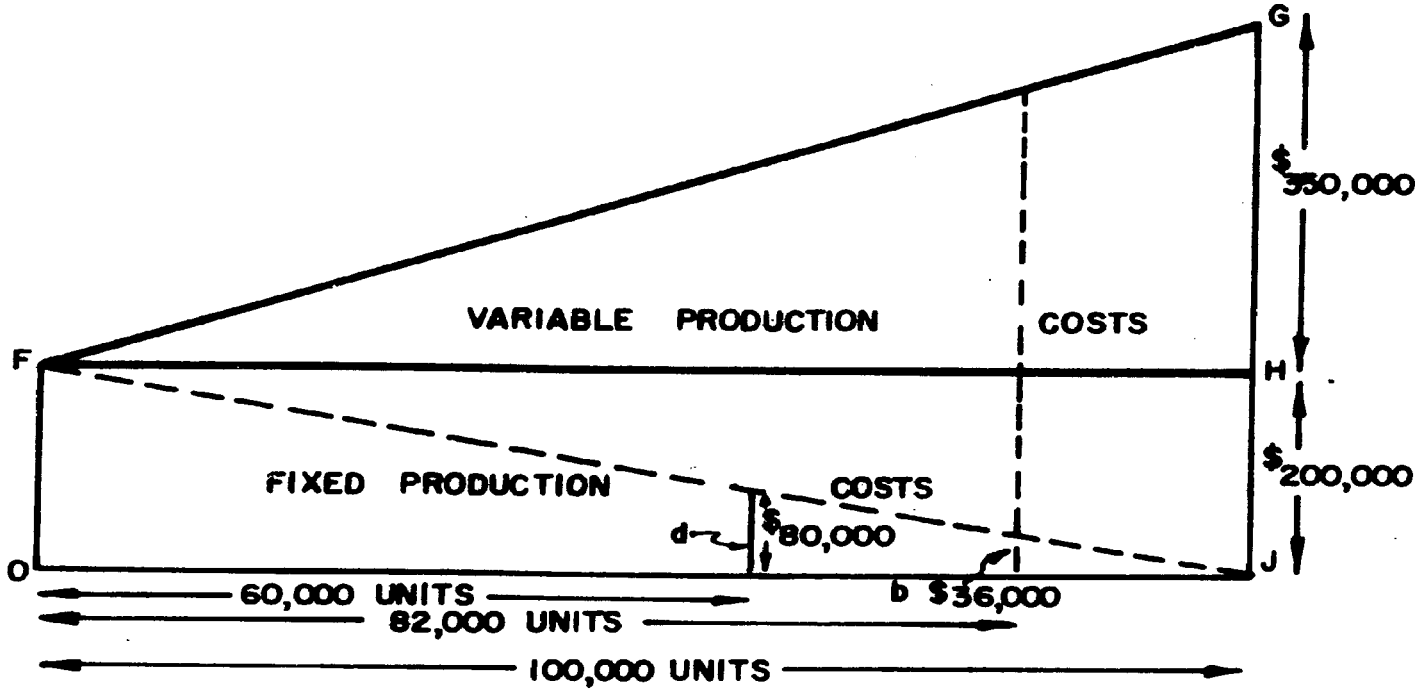


FIGURE 13

PRODUCTION COSTS AND ABSORPTION PLAN



Line FJ is drawn to segregate fixed costs charged to products from the portion charged to current revenues at various activity levels. The vertical distance between lines FG and FJ is, therefore, the measure of total production costs charged to products and the vertical distance between line FJ and the base line OJ is the measure of volume variance.[1]

The excess of forecasted gross margin over budgeted selling and administration expenses, as shown in Figure 12, becomes the forecasted profit if production activity attained is equal to that used in the determination of cost application rates, or, in this case, if production is at the 100,000 unit level. The net income should approximate the excess

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justified as a practical matter. The type of analysis illustrated by use of the diagrams shown in Figures 12 and 13 is not, however, dependent upon this assumption.

[1] Several different approaches to absorption costing were discussed in Chapters III and IV. Figure 13 is intended only to illustrate the mechanics by which the volume variance may be visualized. The diagram shows line FJ intersecting line OJ at J, or the extremity of line OJ. This may imply the use of a type of capacity or maximum activity rate. The diagram is, however, adaptable to other methods. Line OJ could have been extended through point J with the fixed and variable cost lines extended in a similar manner without changing the slope of line FJ. The diagram could then be used to illustrate the use of absorption rates based on any level of activity less than maximum.

Although accountants usually raise objections to volume variance gains as additions to income, they are sometimes treated as such. A diagram such as in Figure 13 allows for the planning of credit volume variance by the extention of line FJ through J below the base line. Expected reported profits may then be calculated to be the excess of gross margin over planned non-production expenses plus the volume variance (or minus a negative volume variance).

of gross margin over the sum of non-production costs[1] at the sales level attained and the volume variance for the production level attained.

For the ABC Company, using the data from Figure 9, sales were at a 90,000 unit level and production was at an 82,000 unit level. Figure 12 shows a forecasted excess of gross margin over non-production expenses of $170,000, or line a, at the 90,000 unit sales level. Figure 13 shows a volume variance of $36,000, or line b, at the 82,000 unit production level. Thus the expected profits or the profit from which deviations should be observed is $170,000 minus $36,000 or $134,000. The discrepancy between this and the $121,000 amount reported, as shown in Figure 9, may be reconciled readily as the net effect of the combined unfavorable results of production cost variances of $15,000 and selling and administration cost excesses of $10,000 and the $12,000 favorable result of increased selling prices.

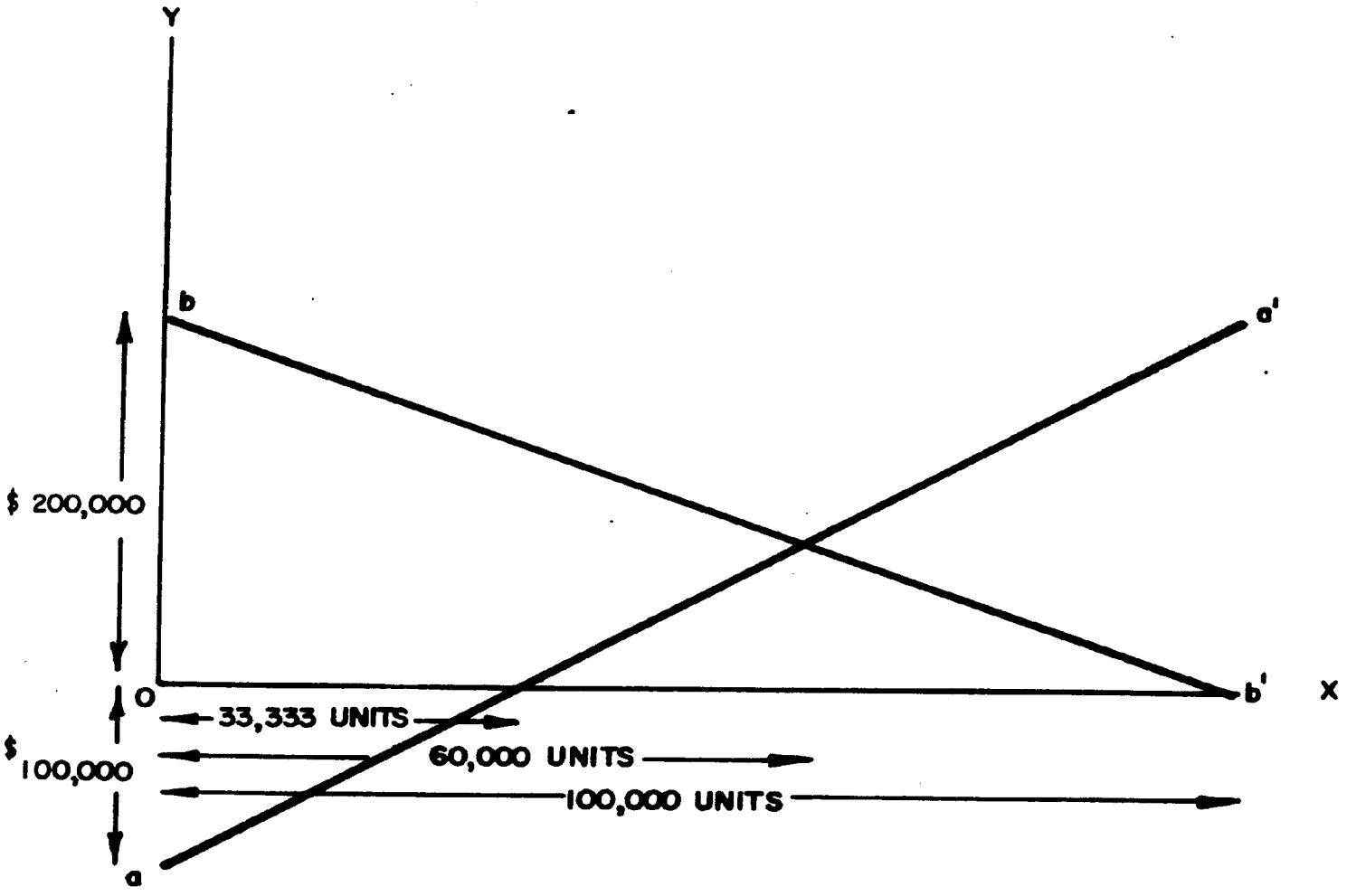
A single diagram may serve to relate data provided by Figures 12 and 13. In Figure 14, the vertical axis is scaled in terms of dollars and the horizontal axis is measured in terms of product units of either sales or production. Line aa' represents the excess of gross margin

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[1]The term "non-production costs" is used here to refer to costs of those activities which have no affinity to the processes of physical conversion or fabrication of salable units of product. Such activities are those whose costs are, by conventional accounting procedures using absorption costing, not considered potentially postponable in the matching of costs and revenues. There is no implication that "non-production activities" are less productive than those connected with the manufacturing processes.

FIGURE 14

BREAK-EVEN CHART



over non-production costs for various sales levels as may be determined from Figure 12. Line bb' represents the volume variance for different levels of production activity. The point of intersection of lines aa' and bb' is the break-even point at which production and sales are equal.

From the two diagrams shown in Figures 12 and 13, or from Figure 14, any number of break-even points may be visualized. At one extreme it may be observed that if output measured in terms of production is at the "normal" activity level and output in terms of sales is only 33,333 units, the operation should break even. At the other extreme if there were no output in terms of production, but output in terms of sales reached 100,000 units, the operation should also break even.

The break-even point of 60,000 units as determined previously by the usual break-even chart may also be confirmed by these diagrams. At 60,000 units of sales the excess of gross margin over non-production costs should be equal to line c in Figure 12 or $80,000. The volume variance for a 60,000 unit production level should be equal to line d in Figure 13 which is also $80,000. Thus a break-even result is yielded. Also, referring to Figure 14, at a 60,000 unit volume, line aa' intersects line bb' showing that at that level of activity the excess of gross margins over non-production costs is equal to the volume variance, and that net income is therefore zero. From diagrams such as these of Figures 12 and 13, or of Figure 14, short-term profit planners and forecasters may use both expected sales and expected production as

determinants of expected profits and management may gain a better understanding of the basic two-fold nature of conventional income determination.

For those accustomed to the use of break-even diagrams, this combination of diagrams may seem cumbersome. It should, however, serve to harmonize profit expectations with reported profits determined by an absorption costing method.

Planning Profit as a Function of Both Production and Sales Volumes

The types of analyses represented by Figures 12, 13, and 14, utilizing both production and sales as measures of output, may be extended diagrammatically as shown in Figure 15 on page 173. Here is shown a line which is the locus of points which represent break-even combinations of production and sales levels. A few such combinations for the ABC Company are as follows:

Sales	Production
100,000 units	-0- units
70,000 units	45,000 units
60,000 units	60,000 units
33,333 units	100,000 units

The break-even line in Figure 15 might be called an iso-profit line where profit is zero. In a similar manner other iso-profit lines may be constructed to show various combinations of production levels and sales levels which should result in any specific amount of profit or loss. Figure 16 shows a few such lines. By envisaging an infinite

FIGURE 15

BREAK-EVEN LINE -- WITH NET INCOME AS A FUNCTION OF BOTH SALES VOLUME AND PRODUCTION VOLUME

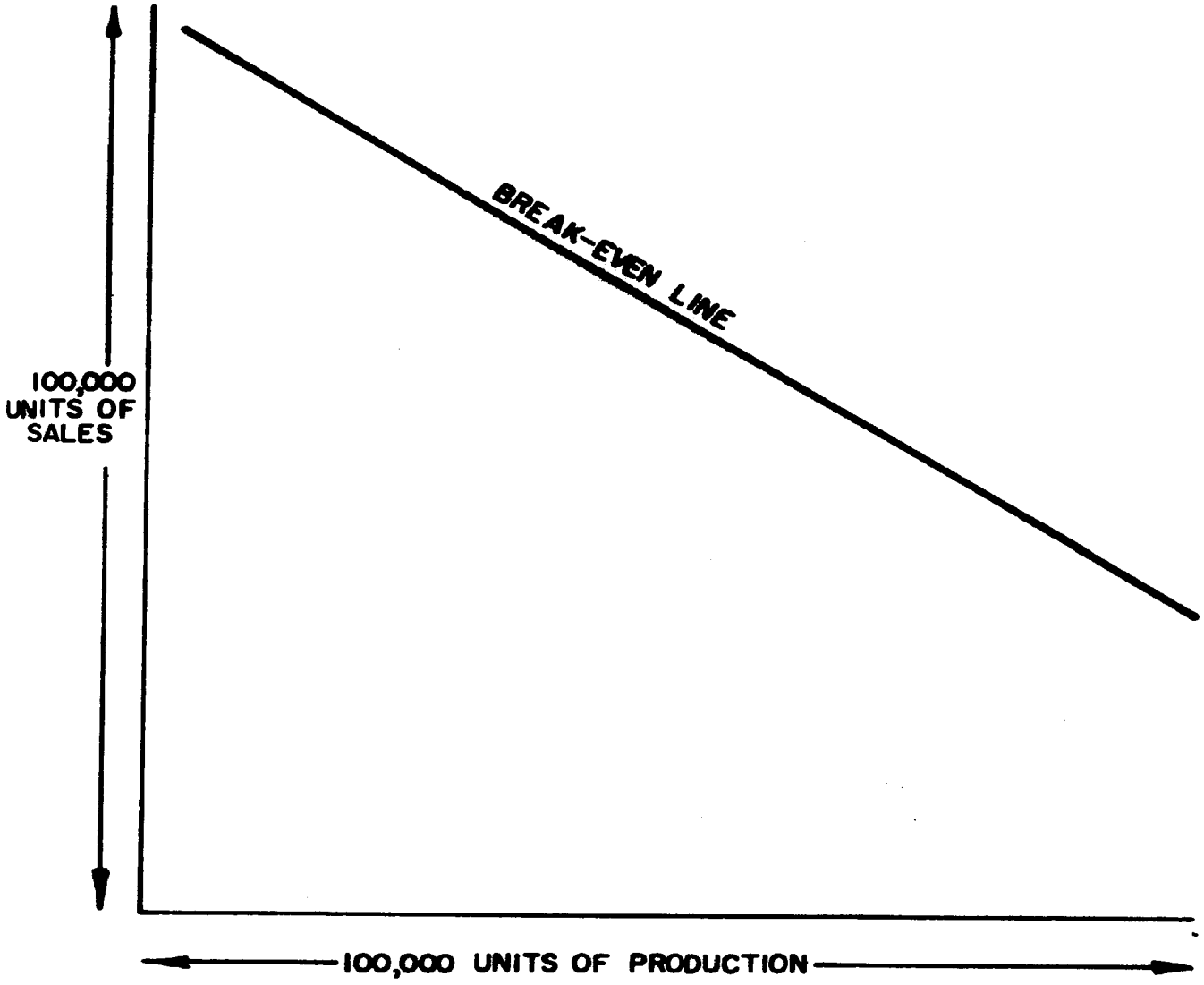
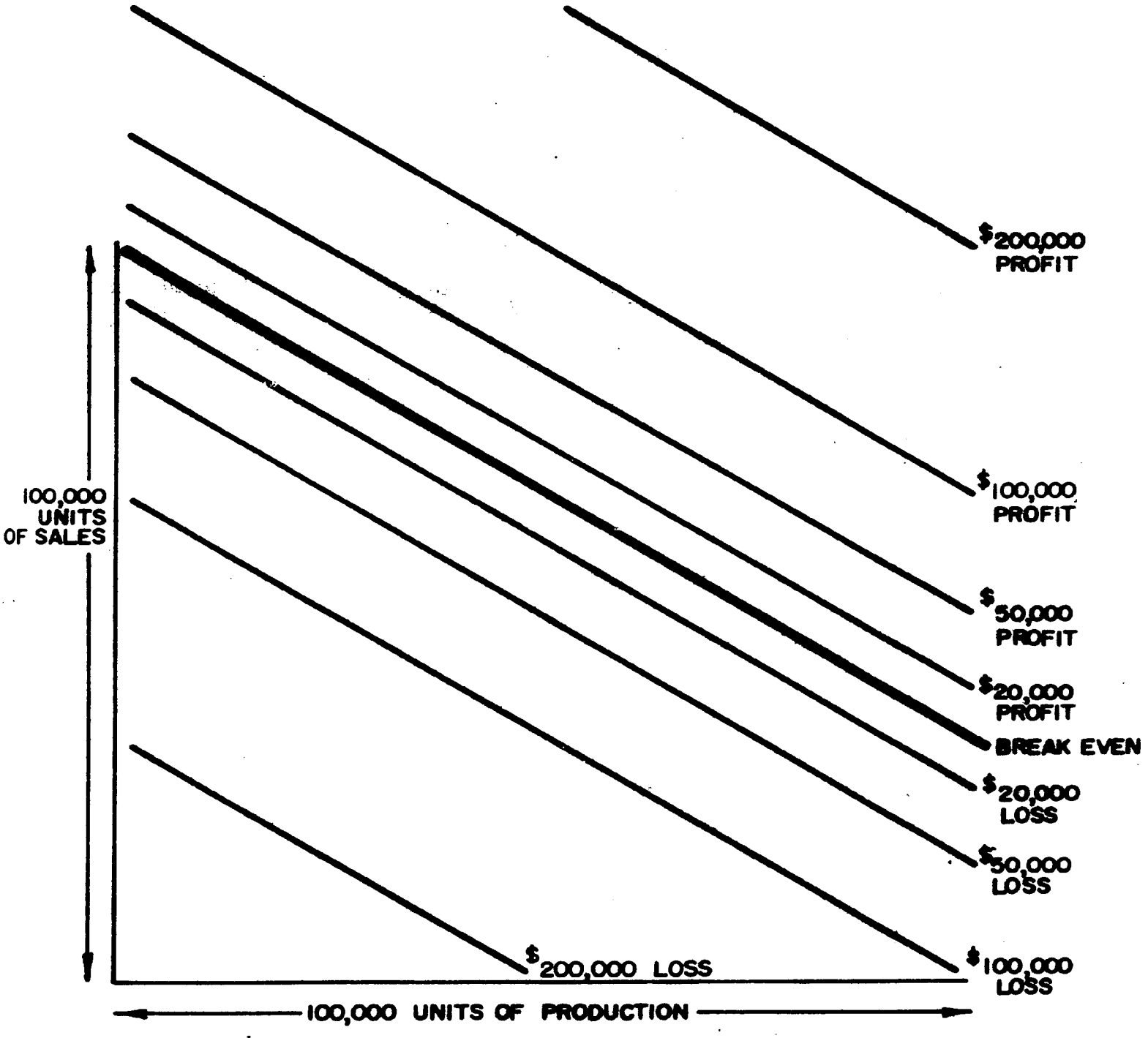


FIGURE 16

ISO-PROFIT AND ISO-LOSS LINES



number of iso-profit and iso-loss lines profit and loss areas are provided with the break-even line segregating them.

It is interesting to note the effects of differing cost mixtures and patterns upon these iso-lines and the profit and loss areas. Generally, the level of the break-even line and thus the profit and loss areas are determined by the relationship between input and output prices and operating efficiencies. The higher the selling prices and the lower the costs the lower will be the sales and production needed to break even and the smaller will be the loss area on the diagram and vice versa. The slope of the iso-lines is determined by the relative effects of sales levels and production levels on computed profits. If production level is measured on the horizontal axis and sales level is measured on the vertical axis as in Figures 15 and 16, increased relative effects of production level will produce steeper iso-lines. Experimentation with this type of diagram verifies conclusions that might otherwise be reached by detailed projections or reflection upon the mechanics involved. Some of these conclusions are as follows:

1. If there were no fixed production costs, iso-lines would be parallel to the axis on which production level is measured, and if there were no fixed costs of any kind, there would be no loss area. [1]

2. If for any given level of activity a greater portion of total costs is represented by production costs and a corresponding lesser

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[1] The latter portion of this proposition assumes that selling prices are in excess of average total variable costs.

portion is represented by non-production costs, iso-lines are made more steep and vice versa.

3. If for any given level of activity a greater portion of production costs is fixed and a corresponding lesser portion is variable, the iso-lines are made more steep and vice versa.

The significance of the type of analysis represented in Figure 16 is not dependent upon a complete understanding of the mechanical reaction of iso-lines to changing business phenomena. Some of the mechanics have been given only to envisage the flexibility of the technique.

There are, of course, both practical and conceptual limitations of the flexible forecasting technique discussed in the past several pages. All of the limitations and problems of static analysis and of forecasting of revenue and cost functions are still involved. Also a degree of simplicity of understanding which is inherent in a single chart with a showing of the relationship between separate over-all revenue and cost functions at various levels of activity has been sacrificed.

On the favorable side, however, the technique allows for a refinement of short-term planning and forecasting. It facilitates the budgeting of production costs as a function of production level and non-production expenses as a function of sales level. It also yields a net income forecast based on a combination of the two measures of output that is readily comparable with conventionally reported profitability.

The single chart break-even analysis as shown in Figure 9 is useful for longer-run planning when the divergence of sales and production levels becomes relatively insignificant. It would seem, however, that

for monthly or quarterly, and perhaps even annual, profit forecasting and analysis the suggested technique has merit.

A Mathematical Approach to Interpretations of Iso-profit Lines

Some of the characteristics of iso-lines such as those illustrated in Figures 15 and 16 may be observed by a simple mathematical development. In Figure 14, a break-even point is shown to be at a point where the excess of gross margin over non-production costs (line aa') is equal to the volume variance (line bb'). The break-even line or zero iso-profit line is a line which is the locus of all points where the excess of gross margin over non-production costs is equal to the volume variance.

If Y is used to represent the excess of gross margin over non-production costs and X is used to represent the volume variance, then, at all break-even points Y is equal to X. In the ABC Company illustration of this chapter, $Y = 3S - \$100,000$, where S is the number of units sold, and $X = \$200,000 - 2P$, where P is the number of units produced.

At all break-even points, for the ABC Company,

$3S - \$100,000 = \$200,000 - 2P$. This equation reduces to

$S = \$100,000 - 2/3P$, which is the equation of the break-even line in Figures 15 and 16. This is an equation of a straight line.

To solve for the equation of the \$50,000 iso-profit line, now, Y

must equal X + $50,000. The equation is found to be S = $116,667 - 2/3P. The form of the equation is the same as that of the break-even line or the zero iso-profit line. The $50,000 iso-profit line is a straight line, and since the coefficient of the variable, P, has not changed, the line is shown to be parallel to the break-even line.

The derivation of the equation of any of the iso-profit lines shown in Figure 16 shows the coefficient of the variable, P, to be the fixed production cost per unit of production divided by the excess of the unit selling price over the total unit cost of production and variable unit non-production costs. For the ABC Company the coefficient of P is 2/3, since the fixed production cost per unit is $200,000 ÷ 100,000 units, or $2.00 per unit, and the $10.00 selling price exceeds the total of the unit production cost of $5.50 and the variable unit non-production costs of $1.50 by $3.00.

The propositions suggested on pages 175 and 176 may now be verified. If there were no fixed production costs, and thus no fixed production cost per unit, the coefficient of P would be zero and the equation of iso-profit lines would be, S = a constant. All iso-lines would be parallel to the axis on which production is measured.

For proposition 2, assuming no change in the relationship of fixed costs to total costs for any given level of activity, the greater the portion of total costs represented by production costs, the greater will be the coefficient of P. This is true since the numerator of the coefficient will be increased by a greater proportion than will be the

denominator. Thus the slope of iso-profit lines will be greater.

Similarly, for proposition 3, if fixed costs become a greater portion of total costs with no change in the aggregate amount of total costs, the numerator of the variable (production volume) will be increased by a greater proportion than will be the denominator, and the slope of iso-profit lines will be increased.

The reverse of propositions 2 and 3 may be shown to be true by visualizing a decrease in the coefficient of the variable P (production volume).

Summary and Conclusions

To summarize, it is important that the mechanics of profit forecasting and planning harmonize with the mechanics of profit reporting. If product costing based on normal overhead rates is proper for profit reporting it should be given effect in profit forecasting techniques, especially for short-run calculations. Figures 12 through 16 and their explanations provide a conceptual technique for accomplishing this objective. They should also serve to sharpen management's, and perhaps accountants', understanding of the net income results of conventional product costing. If management sometimes has difficulty understanding volume variances and wide disparities between fluctuations of sales levels and profit levels for short time intervals, planning, using this sort of technique, may at least weaken the shock which direct costing advocates claim sometimes results when absorption costing profit figures are made known.

CHAPTER VI

OVERHEAD COSTS OF PRODUCTS--
THE MANAGEMENT VIEWPOINT
WITH SPECIAL REFERENCE TO
PRICING DECISIONS

Accounting as a Tool for Management

Prior to the last 30 years the subject of cost accounting was viewed as a rather specialized and detailed type of accounting endeavor, usually applicable to a manufacturing operation. It was thought to have significance primarily as a refining tool which supplemented general or financial accounting. It provided product cost figures to be used for inventory valuations and calculations of net income and, in so doing, yielded a basis for determination of the adequacy of selling prices.

With the introduction of standard costs in the 1920's, followed by developments in budgeting of production costs, a new area of usefulness for cost accounting came into being. Writers and practitioners began to emphasize cost accounting as a tool for managerial control and minimization of production costs. Today, although the degree of success may often be questionable, prefatory comments to textbooks in the cost accounting area usually stress the importance of the subject as an

internal management tool and the authors' avowed purpose to direct attention to this end result. [1]

In 1948, the Committee on Cost Accounting Concepts of the American Accounting Association stated the purposes of cost accounting to be as follows:

(1) to assist in the minimization of costs of performance within the business unit;

(2) to provide information basic to the determination of financial position and net income; and

(3) to provide compilations of cost data designed specifically to aid in the solution of specialized problems of business management. [2]

A successor committee in 1952 practically repeated these objectives as follows:

(a) to accumulate costs necessary to the preparation of general financial statements;

(b) to provide various levels of management with cost data necessary to the control of cost; and

(c) to provide management with cost information necessary to business decisions and related policy. [3]

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[1] Examples of this may be found on the initial page of the prefaces to Theodore Lang, Walter B. McFarland, and Michael Schiff, Cost Accounting, (New York: The Ronald Press Company, 1953), John J. W. Neuner, Cost Accounting, (Homewood, Illinois: Richard D. Irwin, Inc., 1952), and Adloph Matz, O. J. Curry, and George W. Frank, Cost Accounting, (Cincinnati, Ohio: South-Western Publishing Company, 1952).

[2] W. H. Read, "Cost Accounting Concepts--Introductory Statement," The Accounting Review, (January, 1948), p. 29.

[3] "Report of the Committee on Cost Concepts and Standards," The Accounting Review, (April, 1952), p. 175.

This third objective as stated by the 1952 committee was, however, given more emphasis than it had been given previously. The Committee spoke of the development and the usefulness of specialized cost data as opening a "new and dynamic phase of cost accounting." Although generally contributing little new or original, it also emphasized the importance of an awareness and understanding of numerous cost dichotomies, including many which had historically been reserved primarily for the economist who deals with conceptual models involving cost concepts and behavior patterns.

Continuing this line of development the recent report of the Committee on Cost Concepts and Standards of the American Accounting Association broke almost completely from the financial statement oriented type of cost accounting to stress "cost concepts underlying reports for management purposes."[1] Here emphasis is, in fact, placed upon concepts of future costs--an area usually deliberately ignored by financial accounting.

Accounting academicians are more and more demanding a management orientation of accounting procedures and analytical techniques. This may be noted, in part, by the appearance in recent years of textbook presentations such as Cost Accounting and Analysis by Carl Devine; Managerial Accounting by William J. Vatter; Accounting--A Management

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[1]Committee on Cost Concepts and Standards of the American Accounting Association, "Tentative Statement of Cost Concepts Underlying Reports for Management Purposes," The Accounting Review, (April, 1956), pp. 182-193.

Approach by Ronald H. Robnett, Thomas M. Hill, and John A. Beckett; Financial and Administrative Accounting by C. Aubrey Smith and Jim G. Ashburne; and Management Accounting by Robert N. Anthony.

This tendency toward increased emphasis upon management orientation of the work of the cost accountant may also be traced in literature of the National Association of Cost Accountants. The growth of this organization in itself attests to the importance of accounting as an internal management tool.

The growth of "special management services" activities of firms of Certified Public Accountants is also indicative of a recognition of the accountant's tools in the management of business enterprises. Continued growth in this area seems to be almost inevitable.

The title of this dissertation may imply divergent viewpoints of accountants and business managers with regard to associations of overhead costs with units of product. When the role of the accountant is allowed to take on broad aspects of providing cost data pertinent to management activities, these viewpoints may be considered only as differing accounting viewpoints which are dictated by a variety of unlike purposes.

It was stated in the introductory chapter of this dissertation that physical product units do not necessarily provide the most useful factor with which to associate overhead costs for all purposes. In Chapters III and IV, and to a lesser extent in Chapter V, overhead content of product

costs was treated with relation to financial reporting. Some concern was recognized for management's interpretations of net income results and inventory valuations produced by various associations of overheads with products, but primary consideration was given to interpretations to be made by outsiders, (i. e., creditors, stockholders, potential creditors, and potential stockholders). In this chapter consideration is given to practical aspects of operating a business enterprise--some of the problems of directing the internal affairs of a particular business entity. Again it is well to keep in mind that cost aggregates of many different types are helpful in the making of business decisions. It is important to associate overhead costs with activities, responsibility centers, geographical territories, and other factors for various purposes, but here is to be treated only associations with products. Such associations do provide relevant information for certain types of decisions.

Product Costs and Management Functions

Management functions are often classified into categories of finance, marketing, procurement, and production. Cost information is essential for all of these activities. Anticipated costs of all types dictate the need for funds and provide the basis for both long-term and short-term financial planning. For the most part, costs for this purpose are most useful in the form of aggregates analysed in accordance with the timing of cash requirements. Costs of products may provide a

tool for the determination of such aggregates, but the results must not be conditioned by the product cost concepts used in any given case. Overhead costing of products thus finds only limited application in the development of a financial program and the subject is not to be treated here.

Marketing and procurement functions, although in a sense literally opposite activities of disposing of products and of acquiring products, respectively, have much in common. The role of product costs in procurement and marketing activities are related in that the procurement function requires an awareness of product costs of vendors of goods and the marketing strategy which they dictate or encourage vendors to follow. To attempt to treat both of these areas would involve unnecessary duplication. Here will be considered the vital role that product costs play in marketing activities and the product overhead cost concepts useful in this management area.

In the production area management needs product cost information to assist in the minimizing of producing costs. Product units provide the basis for measurement of results of production activities. They provide the basis for the development of standards of efficiency and of plant utilization. Indexes of efficiency may be determined by the relating of costs with the product unit measure of production results. Indicators of costs of idleness may be determined by viewing costs assignable to products as distinguished from ineffective costs. Some of

these aspects of overhead cost associations with products will be treated in Chapter VII.

Overhead Costs of Products--The Marketing Function

The marketing area of activities encompasses many interrelated types of problems which rely to some extent for their solutions upon product cost information. Some of these are: (1) the constitution of the product line or the product mix, (2) the relative sales emphasis to be given product lines and products within each line, (3) the production and sales volumes compatible with over-all objectives, and (4) the establishment of a price policy and the short-term pricing of individual product units. These facets of the problem cannot be treated separately. Perhaps emphasis upon the pricing problem may provide a reasonable focal point from which these different problems may be viewed.

In the making of pricing decisions one finds a most obvious need for the association of overhead costs with products. The profitability and thus the success of a business enterprise depend upon the relationship between output measured in terms of revenues which reflect selling prices and input measured in terms of costs. In order to assure a satisfactory relationship between revenues and costs management must view prices and costs in terms of individual product units.[1] Overhead

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[1]National Association of Cost Accountants' Committee on Research, 1952-1953, "Product Costs for Pricing Purposes," Research Series Number 24, N. A. C. A. Bulletin, (August, 1953), Section 2, p. 1671.

costs must be associated with individual products to aid in pricing activities.

Product costs involving overhead costs become by indirection price determinants when they are used to view results of alternative price structures. It is commonplace to find situations where product costs, variously defined, are used as direct price determinants, i. e., cases where "cost-plus" pricing is used almost exclusively. With the exception of a few situations where a nearly perfect competitive market exists the businessman cannot dodge the pricing problem and he should not ignore the role that costs play in it.

Under static or completely predictable circumstances, all costs could be associated with the product produced to provide unit costs. To the extent that costs are involved, product pricing, the establishment of product line policy, and the problem of relative sales emphasis would be either manifestly simple or non-existent. However, the businessman finds himself in a dynamic and uncertain environment. Most firms produce many and highly varied products; cost factors fluctuate in odd patterns with limited regard for production volume; consumer demands and preferences change rapidly through a wide range and in a sporadic pattern; and competitors vary their product and price policies in reaction to the individual firm's decisions.

Prices must be established for products not yet in existence as well as items already on hand. Prices must be established for special

jobs or orders as well as for usual production. Prices must be determined for products produced and distributed by joint utilization of both physical and manpower facilities. The development of new products must be based on tenuous estimates of market approval. Prices, sales promotion policy, product types, and production and sales levels must be kept under constant observation so that changes may be made to harmonize with changes in competitive forces, changes in production efficiencies, and shifts both in the level and elasticity of demand schedules. These and many other factors tend to complicate the pricing problem and multiply the cost information needed.

The Committee on Research of the National Association of Cost Accountants defines pricing as a

> profit planning problem in which management searches out the alternatives and compares them one against another in order to choose the one which promises to be the most advantageous. [1]

This definition is very general in nature. It might, in fact, apply equally well to many other management problems. It does, nevertheless, give proper breadth to this area of activity.

The searching out of alternatives relates not only to prices but also to volume of production, product types, and costs. These factors are inescapably tied to one another. In general, the higher the price the lower the volume and the higher the average total cost. The lower

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[1] Ibid.

the price the higher the volume and the lower the average total cost. The elasticity of demand and the patterns of cost behavior determine for the most part whether the problem takes the form of fitting of prices to products and costs or of fitting products and costs to prices. It is the relationship between product costs and product prices taken in conjunction with anticipated volume that is significant. The accountant should feel a responsibility to provide management with product cost information and interpretations for viewing this relationship meaningfully.

The need for estimates of future costs. --It must be recognized that pricing as well as other planning decisions relate to matters which affect future events. Future costs rather than historical recorded costs are relevant to most decisions in the marketing area.[1]

This does not mean, of course, that recorded overhead costs of products are useless for these purposes. If the production processing period is short, if finished goods inventories turn over rapidly, and if the price level is relatively stable, such cost figures may be satisfactory as partial costs for pricing considerations. If, on the other hand, the reverse of these situations exists the recorded cost figures provide only a point of departure from which relevant future costs may be

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[1]This is true in a broad sense even where cost reimbursement type contracts are in use. Here the recorded costs may serve as the price determinant, but in real terms the result of such a pricing mechanism depends upon changing economic phenomena, especially that of a changing purchasing power of the monetary unit.

estimated. Thus the degree of emphasis given to recorded overhead cost figures for pricing and related purposes should depend upon the likelihood of changes in such costs over the time period for which decisions are effective and upon management's estimate of its ability to predict such changes. No matter how routinized the determination of product costs may become, management should not lose sight of the fundamental anticipatory nature of problems in the marketing function of management.

Recognizing the relevance of future costs, the need for associations of overhead costs with products may be considered without necessarily implying the use of historical costs recorded in the formal records as opposed to estimates of future costs used in an analysis made outside of the formal records. The technique and theory apply in either case.

The need for all-inclusive costs. --Accountants generally have given much more emphasis to manufacturing overhead costs than they have to selling and administrative costs in the making of associations with product units. This has resulted from accountants' preoccupation with income determination and the profession's reluctance to postpone the assessment of distribution and administrative costs against revenues. As was pointed out in Chapter IV this reluctance may not be entirely warranted even for income determination; but even if it were justified for such an objective, it would still be wholly unreasonable to

associate only manufacturing overhead with products for pricing considerations.

It is perhaps a trite but nevertheless a true observation that prices of products taken as a whole for an individual firm must be at a level to produce aggregate revenues to cover all outlay costs and leave a residual for owner equity if the firm is to continue to exist and generate products. Generally this means that each product or product line should be priced to recover all costs reasonably attributable to it, if it is to remain in the family of products.[1] No costs have priority in the making of decisions in this area. It is just as essential that distribution and promotional costs attributable to a product line be recouped in the price of the product as it is that production costs be recovered.

For pricing matters costs should be as all-inclusive as is practically feasible. The direct and indirect nature of costs, the fixed and variable tendencies of costs, and the alternative uses of physical and manpower facilities utilized are important, but the natural character classifications of production, selling, and administrative costs are irrelevant.

Naive management is often tempted to rely on product cost figures

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[1] There are exceptions to this statement, especially for short periods of time. Certain products may be maintained to support other more profitable lines or loss products whose selling prices more than cover estimates of variable costs attributed to them may be maintained until other more satisfactory products are found or developed to utilize the facilities which would otherwise be idle.

produced by typical accounting routines for pricing purposes. While these costs may be appropriate for inventory valuation and income determination they are almost never wholly satisfactory for pricing considerations. The accountant should feel a responsibility for selecting and quantifying product cost concepts useful in this area.

Economics of price determination. --No attempt is to be made here to discuss fully problems of pricing products. Yet it is necessary to understand some basic fundamentals of the problem in order to determine intelligently the role of product costs and the concepts and analyses that may be useful in establishing prices.

Economists have long been concerned with the interplay of enterprise costs and selling prices. Schools of economic thought relating to price theory developed during the nineteenth century based primarily upon relative emphasis upon cost as a price or value determinant on the one hand, and upon demand on the other hand. Economists and businessmen generally recognize today that long-run prices are a function of both supply and demand. Prices reflect the magnitude of sacrifices necessary to bring products into being (costs) as well as consumers' desires and preferences for products.

Economists have given much emphasis to marginal price theory. They demonstrate that prices, product lines, and production volume will be so determined that marginal costs will be equated with marginal revenues. This theory is based upon the assumption that businessmen

seek always to maximize profits. Defects of this assumption such as a concern for liquidity and solvency, for preservation of the enterprise, and for general social approval are often cited.[1] Yet these objectives may with some reasonableness be justified as short-run objectives which are compatible with maximization of long-run profits.[2] Illustrations of routinized mechanical cost-plus pricing or pricing based upon desired return on investment with no conscious attempt to equate marginal costs with marginal revenues could be cited. Here again, however, it may be suggested that these practices are used in the absence of more refined methods due to the lack of information relating to demand schedules or in the presumption that long-run profitability may be maximized by such practices. At any rate it seems fair to insist that profit maximization is an important consideration in the establishment of prices and that even when other considerations are given greater

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[1] For a discussion of these and other defects of the profit maximization assumption see R. A. Gordon, "Short-period Price Determination in Theory and Practice," American Economic Review, (June, 1948), pp. 265-288.

[2] The Committee on Price Determination for the Conference on Price Research suggests that this difficulty connected with the ambiguity of the time period over which profits are to be maximized "may be removed by substituting for 'profit maximization,' the maximization of the current value of the proprietorship interest in the firm. Since this current value will be affected by any change in anticipated net revenue, the magnitude to be maximized will reflect both short and long-run considerations insofar as they enter into business expectations." Cost Behavior and Price Policy, (New York: National Bureau of Economic Research, 1943), p. 274.

weight the businessman should be desirous of knowing the extent of the deviation from profit maximizing prices.

Three general types of market structure settings may be reviewed with reference to their relevance to pricing problems. First, if a firm is confronted with a perfectly competitive market for its products price determination is a function of the market itself and the individual enterpriser has no choice in the prices he obtains for his products. Typical characteristics of this sort of situation include a large number of autonomous sellers and buyers and highly standardized products. The farmer faces this type of situation. His price is established in the market place (or by government fiat) without regard to the individual farmer's actions. To maximize profitability he must attempt to equate marginal cost with the established price which is, in this case, marginal revenue.

Second, if a firm enjoys a monopoly position the prices of products should be set at a level which reflects the best estimate of demand schedules and cost patterns so as to equate marginal cost with marginal revenue. Marginal revenue here is inevitably lower than the price. In this situation the enterpriser theoretically needs to consider only these factors since there are no competitors who may react in various ways to his pricing policies. This type of situation is rarely found in this country. Even though for short periods a firm may enjoy a near monopoly position as a result of being the sole producer of a certain

highly differentiated item, it is almost inevitable that his profitability will lure other producers to enter into the production of the same or similar substitute products which will dislodge the monopoly situation.

The third situation, and the one almost universally found in this country involves imperfect or monopolistic competition.[1] Here the demand and marginal revenue curves slope negatively as in the monopoly case and profit is maximized by an equating of marginal costs and marginal revenue, but many new factors of uncertainty enter the picture. The demand curve applicable to an individual firm changes not only due to changes of consumer demands and preferences but also because of actions of competitors. The solution to the maximizing objective in such cases becomes a game of strategy.

Although the setting of the price problem and its significance to a successful operation vary, the equating of marginal costs and marginal revenues still is a valid profit maximizing plan. The projection of demand schedules and thus the estimating of marginal revenues are problems of the market analyst. The determination of marginal cost, to the extent that this is possible, should be included in the cost accountant's or cost analyst's bailiwick.

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[1] Economists have been criticized for their preoccupation with the perfect competition and monopoly cases to the exclusion of this more realistic setting. The last quarter century has, however, produced much concern for this type of situation with early impetus provided by major works of Edward H. Chamberlain and Joan Robinson. See Edward H. Chamberlain, The Theory of Monopolistic Competition, (Cambridge: Harvard University Press, 1933), and Joan Robinson, The Economics of Imperfect Competition, (London: The Macmillan Company, 1934).

The reasoning of the economist in establishing working models to interpret individual enterprise activities and the rationale of the businessman in directing a firm's activities do not necessarily coincide. The Committee for Price Determination has stated:

> the logic of economic theory cannot and should not purport to describe closely or accurately the practices of business in making decisions. What it can hope to do is call attention to the data which pertain to particular decisions on the assumption that executives seek to maximize profits, or more accurately, the value of the proprietorship interest in the firm. [1]

In another section of this report the Committee recognized that

> although examples of price and output decisions reached on the basis of economically rational cost and revenue calculations are not lacking, it is clear also that business policies are frequently dependent in part on conventional, rule-of-thumb methods, or may be directed toward objectives not envisaged in the simplified models of economics. [2]

After a study of pricing practices actually being followed, R. L. Hall and C. J. Hitch concluded that for pricing purposes businessmen

> try to apply a rule of thumb which we shall call 'full cost,' and that maximum profits, if they result at all from the application of this rule, do so as an accidental (or possible evolutionary) by-product. [3]

To suspect that, as a general rule, businessmen do not act in

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[1] The Committee on Price Determination for the Conference on Price Research, op. cit., p. 18.

[2] Ibid., p. 6.

[3] R. L. Hall and C. J. Hitch, "Price Theory and Business Behavior," Oxford Economic Papers, No. 2, (May, 1939), pp. 18-19.

light of considerations embraced by conventional analysis in terms of marginal costs and revenues, does not justify the ignoring of possibilities of practical uses of the tool. Perhaps this failure to utilize the analysis is based primarily upon the extent to which measurements of these concepts can be estimated or approximated. If so, a sharpening of methods of quantifying marginal costs and marginal revenues may lead to a change in practices.

The economist's marginal theory is surely worthy of serious study by the price-maker.[1] If the businessman had complete knowledge of current and future demand schedules related to all possible products which his firm might produce and complete knowledge of cost behavior patterns through changing activity levels and through time, surely a calculation of marginal cost would provide an effective aid for price making.[2]

In spite of economists' stress upon marginal analysis and executives' concern for pricing accountants have, prior to recent years, clung tenaciously to the conventional practice of calculating and reporting unit costs by spreading at least the major portion of production overhead costs over product units produced without regard to cost

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[1] This point is strongly advocated by Carl Devine. See Carl T. Devine, "Cost Accounting and Pricing Policies," The Accounting Review, (October, 1950), pp. 384-389.

[2] Complete knowledge of this sort is not available to the business manager and the question arises as to whether the degree of accuracy attainable in quantifying marginal costs and revenues is sufficient to utilize the economist's techniques of marginal analysis.

behaviors. Little attempt was made to approximate marginal costs. This practice has come to be known as absorption costing since it involves the "absorption" of fixed as well as variable cost items.

Accounting practice provides examples of the use of at least three different concepts of absorption costing. These include (1) full short-term absorption, (2) normal long-term absorption, and (3) practical capacity absorption.[1] These different ideas of the amount of fixed overhead costs that should be associated with units of product were considered in Chapters III and IV for income determination and for inventory valuation purposes. For formal record keeping purposes these concepts are, almost without exception, limited to production-connected costs. They are, however, often extended to include selling and sometimes administrative costs in analyses outside of the records for pricing and related problems.

Many accountants and management specialists have in the past several years advocated a technique known as "direct costing" whereby only variable overhead costs are associated with products. Here a crude approximation of marginal costs is realized. Although this technique is claimed by some accountants to have many attributes other

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[1] The three concepts may be considered as the result of varying degrees of effectiveness at which overhead standards are established. One author refers to them in terms of productive capacities as (1) expected actual, (2) normal capacity, and (3) ideal. Accountants' Handbook, Fourth Edition, Rufus Wixon, Editor, (New York: The Ronald Press Company, 1956), p. 6-17.

than the facilitation of price decisions, it is in this area that a substantial portion of its merit may lie. W. R. Wright states, for example, that

> in terms of the roles that costs play in various pricing situations, it is believed that direct costs provide more usable data in almost any situation than do absorption costs. [1]

Illustrations of overhead costing and pricing decisions. --In order not to deal with these concepts only in an abstract setting some illustrations of their uses in making price-related decisions may be observed. [2] First to be considered is the problem of determining the optimum price for a particular product which management has decided to include in its line. Here, as in some of the later illustrations, it is assumed that all costs may be classified into fixed and variable categories with the variable items subject to change in exact proportion to changes in volume. Also it is assumed, for the sake of this first illustration that confidence may be placed in the demand schedule as estimated by the market research department. The following data are to be used:

Variable material and labor costs per unit	$8.00
Variable overhead costs per unit	$4.00
Fixed cost per period	$72,000.00
Practical capacity production	20,000 units
Long-run average (normal) production	16,000 units

[1] W. R. Wright, "Pricing with Direct Costs," The Controller, (March, 1956), p. 115.

[2] The need for making unit costs as complete as is feasible for pricing objectives has already been mentioned. Further references to the three absorption costing concepts and the direct costing concept will, for purposes of this chapter, be assumed to include both manufacturing and distribution costs.

The demand schedule which indicates the relationship between the price and the quantity demanded is as follows:

Price per unit	Estimated unit sales
$21.50	12,000
$20.00	15,000
$18.00	18,000
$16.00	20,000

What price should be established? Comparative income statements could be prepared using any one of the four methods that have been mentioned to show that the $20.00 price would yield the greatest profit. The ease with which management may be able to determine and interpret this conclusion differs, however, depending upon the product cost concept used. If the full absorption method were used results would be as shown in the following tabulation.

Sales			Costs		Net Income	
Price	Units	Total	Per unit	Total	Per unit	Total
$21.50	12,000	$258,000	$18.00	$216,000	$3.50	$42,000
$20.00	15,000	$300,000	$16.80	$252,000	$3.20	$48,000
$18.00	18,000	$324,000	$16.00	$288,000	$2.00	$36,000
$16.00	20,000	$320,000	$15.60	$312,000	$ .40	$ 8,000

The $20.00 price is the optimum price in spite of the facts that the unit margin would be greater at a $21.50 price, the sales revenue would be greater and the cost per unit would be less at either a $16.00 or an $18.00 price.

One unacquainted with the mechanics of the calculations might feel that $20.00 is the optimum price by some unexplained combination of interrelated factors. Perhaps the best the accountant could do to clarify the matter would be to explain that the excess of the $20.00 price over the cost per unit, which is itself a function of the sales volume called forth by the $20.00 price, multiplied by the number of units demanded at the $20.00 price gives the greatest net margin of all the prices considered. Although mechanically accurate, this is hardly a satisfying explanation.

Using a normal long-term absorption method the tabulation similar to the one on page 200 would appear as shown in Figure 17 on page 202. Here the $20.00 price is shown to be the optimum in spite of the facts that the unit margin and total margin would be greater if the price were $21.50, and the sales would be greater if the price were $18.00. The complication of changing product costs has been eliminated from the picture but a new complication has appeared. In addition to costs allocated to products, under- or overabsorbed fixed costs must be covered by the price before net income results.

The $20.00 price is the optimum price because it brings forth sales at a volume which when multiplied by the excess of the $20.00 price over the $16.50 cost per unit gives a margin which when increased or decreased by the over- or underabsorbed fixed costs, which are themselves a function of the sales volume called forth by the $20.00

Figure 17

Net Income Using Normal Long-term Absorption

Sales			Costs		Margins		Overhead Variances	
Price	Units	Total	Per unit	Total	Per unit	Total	Dr. or (Cr.)	Net Income
$21.50	12,000	$258,000	$16.50	$198,000	$5.00	$60,000	$18,000	$42,000
$20.00	15,000	$300,000	$16.50	$247,500	$3.50	$52,500	$ 4,500	$48,000
$18.00	18,000	$324,000	$16.50	$297,000	$1.50	$27,000	($ 9,000)	$36,000
$16.00	20,000	$320,000	$16.50	$330,000	($ .50)	($10,000)	($18,000)	$ 8,000

Figure 18

Net Income Using Variable Costing

Sales			Costs		Margins			
Price	Units	Total	Per unit	Total	Per unit	Total	Fixed Costs	Net Income
$21.50	12,000	$258,000	$12.00	$144,000	$9.50	$114,000	$72,000	$42,000
$20.00	15,000	$300,000	$12.00	$180,000	$8.00	$120,000	$72,000	$48,000
$18.00	18,000	$324,000	$12.00	$216,000	$6.00	$108,000	$72,000	$36,000
$16.00	20,000	$320,000	$12.00	$240,000	$4.00	$ 80,000	$72,000	$ 8,000

price, gives the greatest net income of all the prices considered.

It would be near duplication to illustrate the use of a practical capacity base. Some of the figures would be different, but the complications of understanding the analysis would be similar.

Using "direct costing"[1] or variable product costs the tabulation would be as shown in Figure 18 on page 202. Here the $20.00 price is shown to be the optimum because at that price the greatest contribution ($120,000) is made to fixed costs and profits. The differential revenues and the differential costs are both brought into easy grasp.

The $20.00 price is preferable to the $18.00 price because it causes costs to be decreased by $36,000 while revenues are decreased by only $24,000. In unit terms, the differential revenue loss is $8.00 per unit and the differential cost decrease is $12.00 per unit. The net result of these two differentials or $4.00 times the 3,000 unit change in volume accounts for the $12,000 excess of "contribution" to fixed costs-- ($120,000 minus $108,000). The $20.00 price is preferable to the $21.50 price because the revenues at the $21.50 price would be $42,000 smaller and costs would be only $36,000 smaller. This type of analysis using "direct costing" or "variable costing" appears to explain in an understandable way the reasons for the $20.00 optimum price.

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[1] It is assumed here and in later sections of this chapter that "direct costing" refers to a procedure by which material, direct labor, and variable overhead costs are assigned to products. This seems to be the most usual definition of the term but there is not complete unanimity among those who write about the procedure.

The tabulation and analysis that have been used here is likely to be the types used by businessmen in considering this sort of pricing problem. The analysis is essentially the same type as the more sophisticated approach of the economist who reasons in terms of marginal costs and revenues to determine the profit-maximizing output and price. Using the data of previous illustrations, but supplementing them with data relative to intermediate prices, an analysis may be shown emphasizing incremental factors as in Figure 19. From this tabulation the profit maximizing price (of the prices considered) is shown again to be $20.00. It may now be seen to be the price nearest to the point where incremental cost is equal to incremental revenue and where the incremental profit is zero. The profit maximizing price is shown actually to be slightly in excess of $20.00 since at such a price incremental cost would appear to be equal to incremental revenue.[1]

A second type of situation involves the problem of establishing a price on a special unexpected order. For this illustration it is assumed that the $20.00 price determined to be an optimum in the previous example is used for sales through customary channels. An opportunity exists to do a special job involving 2,000 units at $15.00 per unit for a

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[1] "Incremental revenues" and "incremental costs" are used instead of "marginal costs," as is customary in conventional economic analysis. These incremental revenues and incremental costs could be divided by corresponding incremental units of product to yield averages which would provide practical approximations of "marginal revenues" and "marginal costs."

Figure 19

Incremental Data Calculations[1]

Price	Quantity	Total Revenue	Total Cost	Profit	Incremental Revenue	Incremental Cost	Incremental Profit
$21.50	12,000	$258,000	$216,000	$42,000			
					$24,200	$19,200	$ 5,000
$20.75	13,600	$282,200	$235,200	$47,000			
					$17,800	$16,800	$ 1,000
$20.00	15,000	$300,000	$252,000	$48,000			
					$13,500	$18,000	($ 4,500)
$19.00	16,500	$313,500	$270,000	$43,500			
					$10,500	$18,000	($ 7,500)
$18.00	18,000	$324,000	$288,000	$36,000			
					($ 1,000)	$12,000	($13,000)
$17.00	19,000	$323,000	$300,000	$23,000			
					($ 3,000)	$12,000	($15,000)
$16.00	20,000	$320,000	$312,000	$ 8,000			

[1]This tabulation is similar to one found in Paul A. Samuelson's Economics, An Introductory Analysis, Third Edition, (New York: McGraw-Hill Book Company, Inc., 1955), p. 447.

customer isolated from the usual distribution channels and from usual customers. Although operating already at the long-run normal level, the firm is below its practical capacity and is considering whether or not to accept the job.

Unit cost figures using the various concepts of overhead content are as follows:

Full short-term absorption	$16.00
Normal long-term absorption	$16.50
Practical capacity absorption	$15.60
Direct costing	$12.00

If any one of the first three product cost figures were used the offer would appear to be unacceptable. If the "direct costing" cost were used the offer would be shown to be acceptable. Calculations of net income assuming acceptance and then assuming rejection of the order would show the advantage to be gained by accepting the job. Here the fixed costs are irrelevant. In this case the variable selling costs may also be irrelevant so that even the $12.00 variable cost figure may not establish a floor for the price of this special order. It is the differential or incremental cost, i.e., the costs that will be different if the offer is accepted than they would be if the offer is rejected, that are relevant.

A third type of situation in which unit cost figures might appear to be useful involves a fixed price situation. If demand is nearly perfectly elastic, or if the price is determined by long standing practice, based perhaps on discrete coin denominations such as in the case of the 5¢

or 10¢ candy bar, the determination of an optimum output is vital.[1] To illustrate this situation only full absorption and direct or variable absorption costs are to be considered. Long-term normal absorption and practical capacity absorption would supply slight variances to the comparison of results with the "direct costing" cost, but conclusions to be drawn would be similar.

Assume, for example, that the price of $12.00 per unit is fixed. Overhead costs have been classified as to fixed and variable items, but the variable items are recognized to deviate somewhat from a constant relationship with volume. Management is desirous of determining the optimum output. The following projections of costs may be made:

Volume Level	Variable Material and Labor Costs	Variable Overhead Costs	Fixed Overhead	Unit Cost Fully Absorbed
10,000	$ 80,000	$40,000	$18,000	$13.80
12,000	$ 96,000	$46,800	$18,000	$13.40
14,000	$112,000	$52,600	$18,000	$13.04
16,000	$128,000	$60,000	$18,000	$12.87
18,000	$144,000	$67,800	$18,000	$12.77
20,000	$160,000	$76,400	$18,000	$12.72

It would appear that the full capacity level, giving the lowest average cost would be the most advantageous, and this would seem to be true no matter what the fixed selling price might be. If only variable costs were used the unit costs would be as follows:

[1] In this situation it is of course necessary to tailor the product to fit the price. It is assumed here that this has been satisfactorily accomplished and that demand is strong enough to take all the products which can be produced by the firm's limited facilities.

Volume Level	Variable Costs	Average Unit Variable Cost
10,000	$120,000	$12.00
12,000	$142,800	$11.90
14,000	$164,600	$11.76
16,000	$188,000	$11.75
18,000	$211,800	$11.77
20,000	$236,400	$11.82

Here the 16,000 unit level appears most appropriate. The acid test is of course provided by comparative income statements. Such statements may be shown as follows:

	10,000 Level	12,000 Level	14,000 Level	16,000 Level	18,000 Level	20,000 Level
Sales	$120,000	$144,000	$168,000	$192,000	$216,000	$240,000
Costs	138,000	160,800	182,600	206,000	229,800	254,400
Net loss	$ 18,000	$ 16,800	$ 14,600	$ 14,000	$ 13,800	$ 14,400

The 18,000 unit level is shown conclusively to be the optimum even though the two previous calculations implied 20,000 unit and 16,000 unit levels to be most advantageous, respectively. Here averages are shown to be misleading whether they involve full overheads or only variable overheads. The significant unit costs in this case are the differential unit costs. The differential unit cost figures are as follows:

Unit Volume	Differential Unit Cost
10,000 to 12,000	$11.40
12,000 to 14,000	$10.90
14,000 to 16,000	$11.70
16,000 to 18,000	$11.90
18,000 to 20,000	$12.30

At volume levels below 18,000 units the price of $12.00 exceeds the differential cost per unit and additional units increase profitability. Volume in excess of 18,000 units involves a differential unit cost of $12.30 or 30¢ greater than the $12.00 price. Thus it is not advantageous to exceed the 18,000 unit level.

Illustrations thus far have been limited to single product situations. Differential unit costs which may or may not be the same as variable unit costs have been shown to be relevant for certain types of problems.

When several different types of products are produced and sold the job of associating overhead costs with product units becomes more complex and new problems arise which require product cost information. One of these problems involves the determination of an optimum product mix. Product costs and the margins which they determine should give some clue as to strong and weak products and should be useful in directing relative sales emphasis to be given different products in a line. It seems only reasonable that high margin items should be given greater sales emphasis than low margin items.

To illustrate this type of problem and a possible pitfall connected

with overhead associations with products, the following situation is presented. Observed profitability of two products in a line is as follows:

	Product 1		Product 2	
Selling price		$2.40		$2.40
Production costs--Fixed	$.60		$.20	
Production costs--Variable	.50		.70	
Other costs--Fixed	.40		.10	
Other costs--Variable	.60	2.10	.80	1.80
		$ .30		$ .60

Product 1 is shown to be a low margin item and Product 2 is shown to be a high margin item. Suppose now that the sales manager feels that the sales program can be redirected slightly without incurring any additional costs to favor Product 2. The plan is put into effect with satisfying results as far as the sales manager's immediate objective is concerned. The profit results both before and after the action are as follows:

	Before Change in Emphasis		After Change in Emphasis	
	Product 1	Product 2	Product 1	Product 2
Sales:				
2,000 units	$4,800			
1,500 units		$3,600		
1,000 units			$2,400	
2,500 units				$6,000
Production costs:				
Fixed	$1,200	$ 300	$1,200	$ 300
Variable	1,000	1,050	500	1,750
Totals	$2,200	$1,350	$1,700	$2,050
Manufacturing margins	$2,600	$2,250	$ 700	$3,950
Other costs:				
Fixed	$ 800	$ 150	$ 800	$ 150
Variable	1,200	1,200	800	2,000
Totals	$2,000	$1,350	$1,600	$2,150
Net income or (loss)	$ 600	$ 900	($ 900)	$1,800

The result is that profits are decreased rather than increased as expected. The profit of $1,500 was changed to a profit of only $900. Unit costs including fixed costs are found to be misleading in this case. If only variable costs had been considered the mistake would not have been made. Product 1 has a variable cost of $1.10 so that the selling price provides a $1.30 contribution to fixed costs and profit. Product 2 has a variable cost of $1.50 so that each unit sold contributes only 90¢ to fixed costs and profit.[1] Product 1 should have been emphasized even though it produces a lower margin than Product 2. By giving greater relative emphasis to Product 2 the 1,000 unit loss of volume on Product 1 diminished profits by $1,500 and the 1,000 unit increase in volume of Product 2 increased profit by only $900, thus accounting for the $600 decrease in over-all profit. Here again the differential unit cost which in this case is the variable unit cost is the figure relevant to the sales emphasis decision.

Another consideration closely related to the one explored above involves the adding or dropping of products to or from a product line. Here, as above, the relevant unit cost figures are the differential unit costs. A paradox becomes apparent. Profitability may well be improved by adding a new product which is destined to be a loss item or

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[1] This idea of offsetting variable costs against the selling price to determine "contribution" should not be construed to encourage a ranking of costs. All costs must be covered and there are no priorities among them, yet to analyze a situation such as this in terms of the contribution approach is convenient and appropriate.

by maintaining in a line an old product which has been shown to be a loss item. The "contribution theory" is validated, but per se it is not essential to an understanding of this phenomenon.

Marginal costs and "direct costing."--Many accountants are currently suggesting that all overhead costs should be classified into categories of fixed and variable items and that only the variable items, or those classified as such, should be reflected in unit costs. It is argued that the strength of any product can be measured by the amount of contribution it makes to fixed overhead or, stating the matter another way, each product may be priced by estimating its strength and reflecting this estimate in terms of a margin over variable costs. "Direct costs," meaning average variable costs, is assumed to provide a reasonable approximation of marginal cost.

A most fundamental question is whether "direct costing"--the assignment to products of only those overhead costs that are classified as variable--does provide a reasonable approach to the economist's "marginal cost." First, costs assigned to products by the direct costing procedure differ from the economist's marginal cost concept in that they are limited by the practical problem of making a twofold classification of costs between fixed and variable items. The economist's notion of marginal cost is one of rate of change. It is the slope of the total cost curve of a firm. It may have any conceivable pattern of change. The practical "direct cost" approximation of this concept does

not allow for any change of slope of the total cost line. It associates average variable costs with each unit of product assuming the total cost line to be linear and the marginal cost to be constant. This seems, in many cases, to be a reasonable assumption.[1] Nevertheless the "direct costing" technique provides a more restrictive and less refined result than that envisaged for the economist's marginal costs.

Another significant difference between "direct costing" and "marginal costing" lies in the limitation of product costs under the "direct costing" procedure to explicit manufacturing-connected costs. To the economist marginal cost includes all costs (both explicit and implicit) that result from the production and sale of an additional unit no matter what their business function may be.

The use of "direct costing" product costs for price considerations as if they represent marginal costs may not be damaging in some situations. But the similarity of the two concepts should not lull the price-maker into the assumption that they are the same.[2]

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[1] Empirical studies tend to substantiate this contention. See Committee on Price Determination for the Conference on Price Policy, op. cit., p. 109.

[2] There are indications in current literature that this distinction is not always clearly made. Lawrence and Humphrey, in their book Marginal Costing, (London: McDonald and Evans, 1947), make no effort to distinguish between "direct" and "marginal" costs. The Research Committee of the National Association of Cost Accountants implies the identity of the concepts by speaking of the difference between gross revenue and "direct" costs as "marginal income." "Direct Costing," Research Series Number 23, N. A. C. A. Bulletin, 1952, pp. 1086-1087.

Incremental costs and "direct costing."—Illustrations in earlier pages of this chapter have emphasized the significance of unit variable costs and the "contribution" approach to price-connected problems. In one of the illustrations costs classified as variable were allowed to deviate slightly from a straight line pattern and misleading results were noted. Differential unit costs appear to be relevant unit costs for short-run price decisions. These costs depend not only on the general behavior of costs but also on the quantities of products involved in a particular setting. They are in effect average marginal costs relating to a proposed course of action.

Direct costing advocates again demonstrate how their direct costing procedure makes available incremental or differential cost information. Here again flaws in their contentions may be found. By associating only variable costs with products certain costs which are caused wholly by a particular segment of output are often by-passed because of their lack of sympathetic reaction to quantities produced and sold. The categorizing of certain costs as "variable" allows for only a single base against which to measure variability. Many costs are responsive to multiple dimensional factors. Some costs may not be responsive to general changes in production levels and as a result be classed as fixed even though they may respond to other phenomena which may be connected with contemplated decisions. "Direct costs" or variable costs of a new product, for example, will often not include machine set-up

costs and special product development costs since these items will not be responsive to changes in volume. Costs such as these should certainly be considered as incremental or differential costs relevant to the problem of pricing a new product or the problem of determining the strength of an anticipated addition to a product line.

Also, the desire for simplicity which usually accompanies the use of the "direct costing" technique and perhaps the implication of the term "direct costing" sometimes leads to the treatment of all service department costs as period costs thus by-passing product units. When such a practice is followed additional costs of operating service departments which result from the adding of new products are not reflected in product cost figures thus limiting further their usefulness for pricing purposes.

The need for prices to cover total costs has already been mentioned. Critics of direct costing often indicate their concern for this need by asking a natural question. As stated by W. R. Wright,

> How can management be sure that prices cover total costs unless unit costs include a proper allocation of fixed charges?[1]

Mr. Wright, a staunch advocate of direct costing, then embarks upon an effort to decry costs as an important determinant of price and thus dodges the question that has real significance. To be interested in whether or not a product's price covers its total cost need not imply

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[1] W. R. Wright, op. cit., p. 112.

the condition to be an unalterable requirement. Surely the failure of a product's price to cover its total cost is an indication of weakness and is cause for consideration of possible cost reduction, price increase, or replacement by another product.

To the extent that "direct costing" costs approximate incremental costs, they are useful for certain types of price decisions. If, for example, a firm operating at less than full capacity in a highly competitive situation is asked to bid for a special job which has little or no relationship to work produced for its usual customers, the incremental costs are important. The firm will be better off to bid a price which will make only a very small contribution to fixed costs than to lose the job.

Here, however, some caution is in order. First, in many situations the distinction between regular work and special jobs is difficult to make. If care is not taken, an overemphasis upon only variable or incremental costs in price decisions may, over a period of time, cause a greater and greater portion of activity to be of the special job variety at the expense of regular business and thus cause a lowering of overall profitability.

A second caution relates to the general fallacy of a classification of "fixed" costs. Overhead costs do not always fall neatly into clear-cut categories with regard to variability.[1] Product costs produced by

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[1]One author has stated that "there is no such quantity as 'the marginal cost' of output; there is not even a simple choice between two

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the direct costing practice are therefore determined based upon someone's judgmental decision with regard to tendency for change of certain overhead costs. Costs are fixed only with reference to a certain limited range of activity. Each additional unit of activity accepted by a firm places it that much closer to the point where costs classified as fixed cease to be fixed and rise to a new plateau. All other things being equal, the firm which is well below the activity point where there will be a substantial change of fixed costs is in a more favorable position than the firm approaching the step in its fixed cost pattern.

A third caution, which is closely related to the second, involves the maintenance or loss of flexibility. The acceptance of work to make only a slight contribution to fixed costs involves a relinquishing of a degree of flexibility. The significance of this factor depends upon the possibility of other special jobs at more propitious prices. The price demanded for any special job should include an amount to repay the producer for foregoing the possibility of other opportunities to utilize otherwise idle facilities.

Direct costing or variable costing does not provide a complete answer to management's problem of short-run pricing as some writers

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quantities, short- and long-run cost; there is a large variety of costs to choose from, depending merely on how far ahead you choose to look, and this collection of costs itself varies from day to day as current commitments alter." W. A. Lewis, Overhead Costs, (London: George Allen & Unwin, Ltd., Ruskin House, 1949), p. 12.

would insist. It has several weaknesses and many pitfalls. It does, however, in some situations provide a rough approximation of marginal or incremental costs which is useful for certain short-term pricing decisions. If under a particular set of circumstances average variable costs provide a reasonable approximation of incremental or differential costs through a fairly wide range of activity levels, the cost accountant should provide management with such information on a routine basis. If, on the other hand, costs classified as fixed show tendencies to move to new levels with only minor changes in production levels, the variable costs per unit may actually be misleading and specially calculated incremental unit costs must be made available when price-related decisions are to be made. In any event the unit cost data must be presented to management in such a way as to encourage reasonable interpretation.[1] Their limitations should be made clear and they should be supplemented with other unit cost data.

Long-run and short-run considerations. --It is convenient to view the pricing problem in terms of short-run and long-run considerations. It is not possible to establish an exact length of time which divides short-run and long-run decisions. The concepts here are similar to those

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[1]This should be done taking care not to usurp any of management's decision-making responsibility. The accountant should point out factors that seem to him to have relevance to the decision to be made without being swayed by his personal feeling as to what the form or direction of the decision should be. Management should be made aware of the rationale back of the data provided by the accountant and possibly of an estimate of the margin of error involved.

used in conventional economic analysis. In this connection one writer states:

> When economists talk about "the" short run they usually mean a period of time too short to make changes in the quantity of plant and equipment--i. e., in the "capacity" of an industry--but long enough to make changes in the degree of utilization of that capacity. [1]

The "long run" is explained as

> the period long enough to allow all adjustments to be made, for instance, to allow for the liquidation of plant and equipment and their replacement by other forms. [2]

In a given situation the short run may involve a season which could be a few months or possibly a year, as in the case of the automobile industry, or for special order work which extends over an even shorter period. The long-run pricing problem, on the other hand, might involve an extended period of time such as that for price considerations accompanying the introduction of a new product line with the usual expectation of extended life span, or for the establishment of a price schedule which by nature of the competitive situation is not readily subject to change. [3] It usually encompasses the determination of a pricing

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[1] Kenneth E. Boulding, Economic Analysis, (New York: Harper & Brothers Publishers, 1948), p. 483.

[2] Ibid., p. 482.

[3] An example of this is found in the oligopoly situation in which the firm envisages a discontinuous demand schedule which is highly elastic in relationship to price increases and highly inelastic in

policy or a framework for pricing decisions to be used for an extended period of time.

The illustrations and commentary of the last several pages have dealt mainly with short-run decisions in which measurements of short-run incremental costs were relevant. Yet to be considered is the long-run phase of the marketing function.

If marginal revenues could be determined with precision, approximations of marginal costs (perhaps average variable costs) would be the primary cost concept for use in establishing a profit maximizing price.[1] However, marginal revenues cannot be determined with precision. Samuelson states:

> Realistically speaking, we must recognize that modern business firms--even the largest--cannot accurately determine marginal revenue and marginal cost. They cannot determine their optimum price and output with nice exactitude. Yet the day's work must somehow get done. Prices must be set on their products. Here is where average or unit costs often play an important role.[2]

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relationship to price decreases. The businessman is reluctant to raise prices for fear that volume would decrease so much as to decrease over-all profitability. He is also not inclined to lower prices because he does not feel that sales would be increased enough to offset the lowered unit margins.

[1]Even if marginal revenues could be determined with precision, the "full cost" idea would be involved in considerations of proposed increased plant facilities. Projections of future product costs including fixed costs of new facilities should be compared with anticipated prices to determine the propriety of making proposed plant additions. Here, the full costs of the future are, in effect, the average incremental costs, which, as has been mentioned previously, are related to marginal costs. Marginal cost is the additional cost of an additional unit whereas average incremental cost is the average additional cost of a group of additional units.

[2]Samuelson, op. cit., p. 461.

While businessmen may either consciously or unconsciously bring marginal cost and marginal revenue concepts into play in product pricing, they are justified in desiring "full cost" figures to give added support for their decisions.

Aside from the direct use of "full costs" in the establishment of prices, the concept may provide some indication of competitors' costs. This may in turn give a clue to competitors' reactions to different prices, and thus some basis for estimating the individual company's demand schedule. In this roundabout way "full cost" may aid in visualizing marginal revenues to which marginal costs may be related to determine appropriate prices.

Over the long run management should attempt to adopt a price policy which will produce revenues to cover all costs and provide a maximum, or at least an adequate, return on capital invested. This emphasizes the importance of data concerning total, complete, or full product costs. Business practice provides many illustrations of the use of full costs in pricing matters.[1] Studies made by Messrs. R. L. Hall and C. J. Hitch led them to the conclusion that in default of knowledge

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[1] It is perhaps difficult to be conclusive on this point. Accountants have conventionally calculated a type of "full cost" by products and managements have reflected some awareness of such figures in their determinations of prices, output, and the constitution of the product lines. The line of causation is not altogether clear. Accounting practice with its emphasis upon full costs of products for inventory valuation purposes has doubtless had some effect upon businessmen and their conclusions as to relevant cost data. Yet when one observes well managed major corporations subscribing to the full cost idea today, the independent emphasis of the decision-maker upon full product cost data can hardly be questioned.

of marginal revenue and marginal costs, firms in general follow what they call a "full cost principle." They recognized that

> in some cases this meant computing the full cost of a "given" commodity, and charging a price equal to cost. In others it meant working from some traditional or convenient price, which had been proved acceptable to customers, and adjusting the quality of the article until its full cost equalled the "given" price. [1]

In a more recent article another author writes:

> The full cost of manufacturing, shipping and selling, plus a fair profit, is the usual basis for pricing competitive goods. Generally over a long period of time, this method of pricing will closely approximate the market price of the goods as established by competitive forces. [2]

It does not suffice merely to subscribe to "full cost" for long-term decision making. The term as used in practice is fraught with ambiguities. Some of the problems of quantifying a "full cost" concept and using it in pricing decisions are treated in the next several paragraphs.

Full product costs. --If all production overhead costs are associated with products produced and all other costs are associated with goods produced and sold for any given short period of time, the fixed

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[1] R. L. Hall and C. J. Hitch, op. cit., p. 18.

[2] R. Weaver Self, "Developing Better By-product Costs for Pricing," N. A. C. A. Bulletin, September, 1956, p. 19. Since Mr. Self does not explain how the "fair profit" is determined the result of the policy which he suggests cannot be appraised. The point that he makes in the second sentence of this quotation is subject to criticism. Surely his statement would be true only by coincidence unless the concept of "fair profit" is allowed to flex freely in accordance with changing levels and patterns of demand. In any event this statement provides an indication of concern for a "full cost" concept for pricing purposes.

tendencies of costs will cause unit costs to be high in periods of low production and sales and low in periods of high production and sales. The paradox of high costs when sales are difficult to make and low costs when sales come more easily, is presented.

An attempt to use costs calculated in this manner can only deter the maximization of profits. To the extent that recognition might be given to such unit costs in the setting of prices, i.e., if prices were established by adding an amount to cost, sales volume would doubtless drop off rapidly in periods of low production so that profitability would not be maximized and prices would be so low in periods of high production that unit margins would not be maximized.[1] In addition there would doubtless be adverse effects of such a rapidly and violently changing price policy.

Normal overhead costs or products. --A much more useful concept of costs for formulation of a pricing policy includes overhead costs spread over units produced and sold or to be produced and sold over a period long enough to level out short-period fluctuations of activity level.[2] "Normal" overhead rates rather than "actual" short-period rates should be used.

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[1]This sort of situation is generally used by advocates of the "direct costing" approach to illustrate the absurdities of fully absorbed costs and mark-ups in the establishing of selling prices. See W. R. Wright, "Pricing with Direct Costs," The Controller, (March, 1956), p. 112.

[2]The Committee on Research of the National Association of Cost Accountants states: "Over the long run, management's pricing objective

The use of normal rates in the calculation of product costs inevitably involves a determination of the base to be used in measuring the activity level, the burden items to be included in the budget, and the activity level to be used. These matters will be treated separately in the following paragraphs.

The problem of selecting a base or bases upon which overhead costs may be associated with products is often passed by as having little importance. It is of considerable significance, however, especially in the case of output of varied products. If an inappropriate base is selected product costs may not reflect properly changes in overhead costs and pricing decisions may be faulty as a result. [1]

Theoretically overhead costs should be spread in relationship to activity measures which reflect lines of causation. The base or bases used should have a strong positive correlation with the magnitude of costs to be allocated. One author has stated:

> The measure of the rate of activity should be some physical factor that reflects clearly the services provided by the department or operation; it should not be affected by variations in the uses to which those services may be applied. [2]

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is to obtain prices for the company's products which will return all costs and provide an adequate return on capital invested. For such a purpose, long run normal or average cost of the product constitutes a better guide than does the cost which prevails in any given short period." Research Series Number 24, "Product Costs for Pricing Purposes," (August, 1953), p. 1709.

[1] Ibid., p. 1714.

[2] William J. Vatter, "Accounting Measurements of Incremental Cost," The Journal of Business of the University of Chicago, (July, 1945), p. 148.

For depreciation, supervision, taxes, insurance, and other items usually classified as fixed, the causation factors are not obvious, but judgment should dictate some preference based on observed relationships. In most cases, machine or man hours provide a more justifiable base than do units of product and are certainly more justifiable than valuation of product.[1]

The need for all-inclusive costs for planning purposes has already been mentioned. Although selling and administrative types of costs may be excluded from product costs for financial reporting, they must rank with production costs for pricing and related decisions. Engineering and research and development costs are also often charged off as incurred and thus are not assigned to product units. These too should be allocated to products to provide useful cost data. All explicit costs not capable of direct association with product units should be included in budgets used for determination of normal rates.

The problem of determining an activity level over which to spread overhead costs in the determination of application rates is most controversial. Accounting practice provides two main schools of thought in this matter. One school holds that expected activity level or a forecasted average activity level should be used and the other insists that physical capacity scaled down to a practical figure with no regard for

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[1]To use relative valuation of products as a basis of overhead allocation for pricing purposes and other related matters would involve circularity that would be self-defeating.

the market outlook is the proper base. Also with regard to the first contention practice differs in terms of the time period used; i. e., a period of a year or less as opposed to an extended period encompassing a complete business cycle.

Reactions of business executives to these concepts of a normal volume for overhead application are of some interest. One whose company uses the coming year's expected volume states:

> We do not fool ourselves by using an arbitrary normal volume. What we are after is representative actual costs. [1]

Another states his criticism of a long-run volume base as follows:

> When business is good, the overhead costs based on normal volume are not high enough, and when business is poor they are too high. [2]

Still another reaction which emphasizes the short-term nature of price decisions suggests that

> managements' pricing actions are limited to getting the best price obtainable under current market conditions. Because of the very large capital investment and nature of the industry, operation at high volume must be continuous. The physical bulk of the product makes it impractical to store more than a small portion of the output and hence sales are made at prices which will keep the products moving. We cannot see how a product cost based on long-period normal volume would be helpful in this company. [3]

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[1] C. B. Nickerson, "The Cost Element in Pricing," reprinted from Harvard Business Review, Vol. XVIII, No. 4, pp. 417-428, in Malcolm P. McNair and Harry L. Hansen, Readings in Marketing, (New York: McGraw-Hill Book Company, Inc., 1949), p. 625.

[2] Ibid.

[3] Committee on Research of the National Association of Cost Accountants, "Product Costs for Pricing Purposes," Research Series Number 24, N. A. C. A. Bulletin, (August, 1953), p. 1711.

On the other side of the controversy also may be found interesting reactions. In a statement submitted to the Subcommittee on Profits of the Joint Committee on the Economic Report, Mr. M. E. Coyle, an Executive Vice President of General Motors Corporation, stated the limitations of the role of costs in price determinations and emphasized demand and competition as the prime factors involved. He did, nevertheless, state clearly that

> General Motors' approach to pricing is predicated on a measurement of unit costs calculated on a standard or average volume rate of operations which takes into account plant capacity and the market potential over the long term. . . . In approaching the problem of pricing our products, the unit costs thus will not be affected by short-term fluctuations of volume. [1]

These reactions of business executives are doubtless colored by the type of product cost information which they have grown accustomed to using. Some of them do little more than indicate a recognition of the importance of demand schedules conditioned by buyer preferences and competive pressures and the resulting limited role of costs.

Another type of approach unnecessarily implies a direct relationship between product costs and prices. For example, the volume base for applying overhead costs has been stated to be the "volume necessary to yield a reasonable and competitive cost. The sales forecast for a

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[1] M. E. Coyle, Profits, Prices, and Products, Statement and Discussion before Subcommittee on Profits of the Joint Committee on the Economic Report, (Washington, D. C., December 20, 1948), p. 4.

period may be more or less."[1] This quotation hints that product costs should be determined as a function of product prices. To accept such a method would rule out any usefulness of product cost information for price decisions.

Psychological benefits or financial expediency may justify widely varying reactions such as those reported above. If considerations are limited solely to price-related problems, however, this range of divergence seems somewhat incongruous. Nevertheless it would not be proper to conclude that only one concept is useful and that the other is of no value at all.

An important determinant of the appropriate concept for a given situation would seem to involve an estimate of competitor and customer reaction to frequent price changes. If these factors make it disadvantageous to change prices often, and this is likely to be the case, surely long-run cost absorption would provide more usable cost figures for determining price policy.

The nature of products and cost commitments required by their production may also provide a clue. If many cost commitments relate to short-lived products and are therefore made for relatively short periods of time, say a year or less, the short period activity base is relevant. An example of this might be found in high-style or novelty

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[1] Committee on Research of the National Association of Cost Accountants, op. cit., p. 1713.

products where retooling may be necessary at frequent intervals of time. If, on the other hand, relatively standardized products are made year after year with changes in production techniques taking place more slowly with attending substantial long range cost commitments, the long period business cycle base is more appropriate.

Another controversial point which has already been mentioned relates to the use of expected volume as opposed to a practical capacity volume in determining overhead rates. The problem reduces to the question of handling costs of idle physical and manpower facilities. If anticipated volume is used and over the long run actual activity approaches this anticipated volume all fixed costs, including costs of idle facilities, will be assigned to products. If a capacity rate is used only effective fixed costs will be associated with products. In a sense then the question relates to "full costs" compared to "partial costs."

Examples of varied practices in this connection may be noted. Mr. Coyle states that General Motors' pricing policy is based on costs calculated on a volume which takes into account both capacity and long-run market potential.[1] He goes on to indicate that "General Motors expects on the average to run car plants about 80% of the rated daily capacity" and that for the period from 1928 to 1941 they averaged 86% of this 80%.[2] The "rated capacity" concept used by General Motors is similar to the practical capacity concept which has been discussed

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[1] M. E. Coyle, op. cit., p. 4. [2] Ibid., p. 28.

previously. The 20% reduction of this figure to 80% of "rated capacity" represents the adjustment needed to produce an activity level figure which reflects the expected long-run market situation. Thus, although the concept of capacity activity level is used in the process of determining the overhead rate volume base, it would appear that the final level used is determined by an estimate of long-run market potential. [1]

The Committee on Research of the National Association of Cost Accountants reports a typical reaction of executives of firms which use average or anticipated activity levels as follows:

> Our standard volume is set by long range sales probability limited where necessary by capacity of plant, manpower, or materials available. Where equipment in certain centers cannot be used to capacity because of limited need for that type of machine, the cost center burden rate is based on the probable hours of use. [2]

The objective here is clearly a "full cost" approach over the long term.

The Committee also reports that some companies use "partial costs" for price considerations by computing overhead rates on "full capacity of the plant to manufacture on a sustained basis" or the "practical capacity to manufacture." [3] Representatives of these companies

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[1] It is likely that the 80% utilization factor is applied in decisions related to plant expansion and required capacity. This does not, of course, have any direct bearing on the overhead costing problem.

[2] Committee on Research of the National Association of Cost Accountants, op. cit., p. 1712.

[3] Ibid., p. 1713.

point out that

> this method is preferred because costs based upon such a volume had resulted in prices which were competitive in periods of depression and prices which were also profitable when business was good. [1]

It may be convincingly argued that costs attending unutilized facilities are not literally costs of products. It may also be insisted that there is no reasonable basis upon which to assign idle time costs to product units. Nevertheless, since revenues which are a partial function of prices must cover all costs to make an operation profitable, it would seem that "full costs," including costs of idleness, are more useful for price considerations than partial costs which include some, but not all, of the long-run anticipated costs. [2]

The use of "full costs" including fixed items is often advocated for price policy matters and their long range effects while emphasis is placed upon differential or variable costs for short-term matters. [3]

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[1] Ibid.

[2] The Committee suggests still another interesting concept involving the use of a "volume necessary to yield a reasonable and competitive cost." This smacks of a complete loss of objectivity in accounting analysis. Such a base would provide nothing in addition to that known in advance and would therefore be useless for pricing or any other mangement decisions. Ibid.

[3] This is the general conclusion of the Committee on Research of the National Association of Cost Accountants as indicated in Research Series Number 24. There is some danger of oversimplification of pricing problems when they are placed into these two categories. There are typically short range implications of long-run problems and long range implications of short-run problems. Care must be taken to see that long term price policy does not unduly restrict day-to-day price

Even in the short run, however, some recognition of fully absorbed product costs is necessary. The price-maker may be well advised to give recognition to total unit costs in periods of low activity in order not to encourage cut-throat price competition which will harm rather than benefit profitability in the long run. In periods of high level activity "full costs" may provide a means of choosing among alternative projects which vie for the services of scarce factors of production and distribution. As Carl Devine has pointed out by way of illustration:

> Job A may be quoted at a price that will yield $300 above the costs for which it is responsible and Job B may cover its variable costs and contribute $200 toward the recovery of fixed charges and the formation of profit. It does not follow of course that A should be accepted for production and that B should be rejected. If Job A requires twice as many hours of scarce factory facilities, it is clear that two B jobs contribute $100 more than one A and may be produced with no more utilization of limited factory time. This direct approach to the problem of accepting or rejecting orders may usually be applied to the problem of setting relative prices. For each item usually produced time estimates may be prepared and prices may be scheduled to yield identical contributions per unit of scarce factory time. [1]

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decisions and restrain management from taking advantage of unforeseen opportunities. On the other hand, short-run day-to-day pricing cannot function satisfactorily without a long range policy to provide a general guide.

This latter point is made strongly by Mr. Nickerson. He states that many businessmen "are continually beset with immediate or short-run problems that absorb their time and effort and even cast a short-run shadow on their long-run thinking. . . . The long-run seems forever in the future, until it is too late to do anything about it, and it is rather popular to regard pricing as a short-run problem in which costs can be ignored, sometimes forgetting that one day slips into another and the long run is actually a series of short runs." C. B. Nickerson, op. cit., pp. 619-620 and p. 629.

[1] Carl Thomas Devine, "Cost Accounting and Pricing Policies," The Accounting Review, (October, 1950), p. 389.

Mr. Devine then notes that total unit costs including fixed overheads assigned on a time basis measures, although somewhat crudely, the relative usage of the scarce factors of production. He concludes that

> to the extent that facilities for handling materials and accommodating labor are limited the usual markup procedure based on total unit cost may provide a simple rule for pricing for high profits at full capacity. [1]

Those who advocate "partial costs" for pricing, involving exclusion of all or a portion of the fixed items, suggest an appealing feature to be its freedom from arbitrariness. As Beckett points out,

> direct costs give a knowable and definite base for pricing while "total cost" adds to this rather pure base a layer of cost which is very often quite arbitrarily assigned to various different products. [2]

Although admittedly arbitrary in some cases the assignment of fixed overhead costs to products should not be condemned in general. Allocations should be made and full costs should be provided in terms of product units. The presentation of such full costs of products should be accompanied by explanations to encourage an awareness of the extent to which arbitrary apportionments have been included. The cost accountant should strive to minimize arbitrariness in allocations of costs to products but the inability to maintain complete freedom from it should not provide an excuse for inaction.

Standard overhead costs. --The distinction between "normal" and "standard" overhead costs is not always made clear. To the cost

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[1] Ibid.

[2] John A. Beckett, "A Study of the Principles of Allocating Costs," The Accounting Review, (July, 1951), p. 330.

accountant or the engineer there is, however, a very definite difference. Standard overhead rates serve to level out charges to product units and in so doing impart a feature of "normalcy" but this is not their prime characteristic. Cost standards generally are based upon desired goals, objectives, or levels of performance. For overhead costs this involves established cost objectives for various activity levels and a desired activity level.

The use of different activity level bases for pricing problems has already been treated.[1] No concern has been expressed thus far for performance standards in the sense of cost objectives for any given level of production. In this area, practice differs widely so that it is not feasible either to condone or to condemn the use of such standards generally for pricing.[2] In most instances standards are used primarily as a means of cost control. For this purpose performance objectives may be set at levels well beyond normal expectation. The resultant product

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[1] Of the methods mentioned earlier the practical capacity concept may most reasonably claim the name of standard. It represents a desired, if not anticipated, activity level.

[2] A Committee on Cost Concepts and Standards of the American Accounting Association emphasized this point as follows: "Since standard costs may serve management for a number of purposes, the standards that are constructed are established in terms of the purposes that they are primarily to serve. There can be, therefore, no one standard cost of anything, but there may be several different standards to whatever extent needed to serve the purposes at hand." "Report of Committee on Cost Concepts and Standards," The Accounting Review, (April, 1952), pp. 174-188, quotation from p. 177.

costs are limited in their application to price decisions. Also product cost standards are in some cases used only as unchanging benchmarks which are seldomly revised.[1] Costs so determined depart from reality to such an extent as to be useless for pricing purposes.[2] If, however, standard overhead costs per unit are carefully established and maintained at reasonably good attainable performance levels they may be used for price considerations. An important advantage is provided by their prompt availability and their flexibility in making application to new and different products.

Summary and Conclusions

The problem of assigning overhead costs to products to provide data relevant to decisions in the marketing area has many interrelated facets. The focal point of concern here has been the pricing function.

It is important at the outset to recognize the nature of the role

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[1] Standards of this sort are sometimes referred to as "bogey" or "basic" standards. Eric A. Camman has been a strong advocate for their use. See Eric A. Camman, Basic Standard Costs, (New York: American Institute Publishing Company, Inc., 1932), 232 pages.

[2] The writer has observed a situation where a fairly large firm with many products has used the same overhead rates in their formal accounts for more than five years. During this period of time overhead costs have increased and direct labor costs to which overhead rates are applied have decreased as a percentage of total production costs. The management of this firm is cognizant of the unreality of product costs based on these rates. For pricing purposes estimates are made of current actual overhead costs and products are costed accordingly without reference to procedures followed in the routines of the accounting system.

that costs play in pricing. In certain instances product costs may be used as direct determinants of prices by merely applying a prescribed mark-up. This practice is basically unsound since it ignores demand considerations. It can be justified only as a crude means of maximizing profits in the absence of a knowledge of demand schedules and competitors' reactions to pricing policies.

The role of product costs may better be viewed as a means of measuring anticipated profit results of various price and volume alternatives. Product costs do affect prices but they are not, as a rule, the sole determinants. They serve as a resistance to price decreases. They provide a flexible floor for prices[1] but not a ceiling.

This rather indefinite role of product costs for pricing purposes and the wide range of competitive practices and economic settings

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[1] Many writers emphasize incremental costs per unit as the floor below which products may not be priced. Certainly this level represents a point of major resistance to price decreases, but it should not be considered an absolute limit upon short-run prices. Devine has pointed out that "if costs of shutdown and resumption are important, it is obviously more profitable to price below variable costs for a short period than to stop production. If the products are differentiated and identified by brand names, businessmen may sell far below variable costs in order to keep the brand names before the public. Contract suppliers, even when business is good, will sometimes bid a job at less than marginal cost with the hope of getting more profitable business from the customer at a later date. Finally in spite of the fact that altruism is not expected in a self-interest economy, some managers feel a responsibility for worker welfare and will continue to operate at prices far below variable cost. It seems clear that there is no discernable lower limit (except perhaps zero) to short-period prices." Carl Thomas Devine, op. cit., p. 386.

which confront different firms make a definite conclusion on overhead costing of products for pricing inappropriate. Some generalizations may, however, be made.

Price decisions relate to the future. The most useful product overhead cost information for pricing is, therefore, provided by projections of future costs. Historical overhead costs of products furnish the point of departure from which projections may be made.

Since revenues, which are a function of prices, represent the sole means for recouping costs of all kinds, it logically follows that no costs should, because of their natural characteristics, outrank others in their association with product units. This means that distribution costs as well as production costs should be associated with product lines and units to maximize the usefulness of product cost information.

Price decisions of primarily short-run significance such as bidding on special jobs or pricing to meet a temporarily depressed market condition require an awareness of incremental unit costs. The direct costing procedure whereby only costs classified as variable are assigned to products provides a crude approach to this requirement.[1] To be used with confidence there must be evidence that the cost function related to volume is linear and free from discontinuities over the range of activity significant to a particular decision. When these circumstances

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[1] The direct costing technique is usually thought of as encompassing only production cost items. It may be extended here to include the association with products of all variable costs, including those usually classified as selling and administrative.

prevail the direct costing product costs approximate the economist's marginal cost and enable management to make comparisons with estimates of marginal revenues in an attempt to maximize profits.

Short-run pricing decisions must be considered in the light of a long-run pricing policy which reflects plans for profitable operations. This long-run price policy, as well as promotional and product policies, should be based, at least in part, upon total product cost calculations in order to maximize over-all profitability. Total costs of products for these purposes should include allocations of fixed costs based upon expected actual levels of production and distribution. The time period used as a base for such allocations should be long enough to level out the effects of seasonal and cyclical deviations over which management has little if any control.

The use of efficiency standards in the assignment of overhead costs to products provides flexibility and promptness. When they are used for price-related matters, care must be taken to assure that they represent reasonable attainable performance and not an idealistic and hence unrealistic level of accomplishment.

There is danger in any attempt to simplify price, volume, and cost problems. No matter what sort of product cost is being accumulated, management should be made aware of the assumptions implicit in the calculations and the limitations of the resulting cost figures. The lack of a definite or specific answer to the problem of overhead

costs of products for pricing problems may find some justification in the words of Alfred Marshall regarding characteristics of a dynamic economy. He wrote as follows:

> Every economic force is constantly changing its action, under the influence of other forces which are acting around it. Here changes in volume of production, in its methods, and in its cost are ever mutually modifying one another; they are always affected by the character and the extent of demand. Further all these mutual influences take time to work themselves out, and, as a rule, no two influences move at equal pace. In this world, therefore, every plain and simple doctrine as to the relations between cost of production, demand and value is necessarily false; and the greater the appearance of lucidity which is given to it by skillful exposition, the more mischievous it is. A man is likely to be a better economist if he trusts to his common sense, and practical instincts, than if he professes to study the theory of value and is resolved to find it easy. [1]

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[1] Alfred Marshall, Principles of Economics, Eighth edition, (London: MacMillan and Co., Ltd., 1920), Book V, p. 368.

CHAPTER VII

OVERHEAD COSTS OF PRODUCTS--THE MANAGEMENT VIEWPOINT WITH SPECIAL REFERENCE TO COST CONTROL

The association of overhead costs with products has been considered as it relates to decisions in the marketing area, with special reference to pricing. Another important area of management concern involves the control of costs, i. e., the effort to minimize costs of carrying out plans for acquiring, producing, and distributing goods and services. In this chapter consideration is given to the associations of overhead costs with physical units of product as a tool for control of costs. Some, if not most, of the terminology used will imply an emphasis on manufacturing costs, but the techniques and logic suggested have equal application to other types of costs.[1]

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[1] Costing techniques used for control of manufacturing costs are usually given more emphasis than those used for control of distribution costs. This has doubtless been the result, at least in part, of the concern which professional accountants have had for inventory valuations which include manufacturing costs and exclude distribution costs. Also accountants have found greater objectivity and less uncertainty in the manufacturing cost field than they have found in dealing with distribution costs. It appears to be a natural and perhaps reasonable human tendency to deal first with the simpler aspects of any problem.

The assignment of actual overhead costs to product units provides some assistance in the attempt to control costs. By relating overhead costs for a period to units of product produced during the period a crude index of efficiency is provided. This sort of index, however, has serious limitations. If the time period used is short, as is necessary if product cost data are to be even potentially useful, short-term fluctuations of costs and volume are likely to affect unit costs so much as to prevent meaningful comparisons with unit costs of other periods. If these situations did not exist, comparisons of unit costs of different periods would be interesting and perhaps indicative of favorable or unfavorable developments, but no explanations of causes of unfavorable developments would be available and no information would be provided to point toward possible corrective action. Management would still have no indication of the reasonableness of the cost levels experienced or of possibilities for increased efficiencies.

Control of overhead costs, as well as other costs, through product or service unit costing involves primarily the use of standards of performance and exception data. Useful product overhead cost concepts for control must involve standard costs. Standards of performance represent achievement benchmarks which, it is hoped, provide a psychological incentive or motivation to responsible employees. Information with regard to deviations of performance from the benchmarks, or exception data, provides a tool for administering performance standards.

Many writers have pointed out that performance standards provide effective motivation and useful exception data only when they are established in terms of individual employee responsibilities. Responsibility breakdowns are usually in terms of departments, functions, or activities rather than in terms of products. It follows, therefore, that for control purposes it is more appropriate to associate overhead costs with these departments, functions, or activities than with units of product or service.[1]

Routines of cost accounting systems usually emphasize the build-up of product cost information. They do, however, involve allocations of overhead costs to responsibility centers as a step in the process of building up unit costs. Product or service units often provide the unit

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[1] William J. Vatter emphasizes "activity accounting" as the essential feature of cost control. "Costs must be related to the things being done, and this is largely a matter of setting costs against decisions." William J. Vatter, "Tailor-Making Cost Data for Specific Uses," 1954 Conference Proceedings, N. A. C. A. Bulletin, (August, 1954), p. 1697.

Also, in an article which has gained much recognition in the management accounting area entitled "Responsibility Accounting," John Higgins illustrates in detail the breakdown of "controllable" costs into responsibility groups. He summarizes his theme by suggesting that it involves a "change of emphasis from product cost to the cost control aspects of accounting wherein the statements to management emphasize the control of costs by reporting and summarizing them on the basis of 'who did it' before they are adjusted and blended for product cost purposes to obtain the conventional financial statements." John A. Higgins, "Responsibility Accounting," The Arthur Anderson Chronicle, April, 1952, as reprinted in William E. Thomas, Editor, Readings in Cost Accounting, Budgeting, and Control, (Cincinnati: South-Western Publishing Company, 1955), pp. 101-128, with quotation from p. 128.

of measure of the results of an activity which in turn determines the performance standard in terms of cost dollars for the activity for a particular time period. Although the end result of overhead assignment to products is of limited significance to an attempt to control costs, the path followed in the accumulation of product costs is most significant. If unit overhead standards are loose it is likely that activity or functional standards will be loose and vice versa. If many overhead costs by-pass the product inventories route they are likely also to by-pass functional responsibility centers and vice versa.[1] The tendency for product costing practices to be reflected in functional costing procedures justifies the consideration of overhead costs of products for control purposes.

Efficiency Motivation

The content of overhead cost assignments to responsibility centers is fundamental to the use of overhead costing as a motivating device. The subject is one in which psychologists and sociologists find much of interest and have much to contribute. Here are to be considered only some fairly general observations based on varied practices with which industrial accountants are familiar.

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[1] The procedures outlined by Higgins, Ibid., represent an exception to these statements. They involve the assignment of only "controllable" costs to functional responsibility centers while product costs are calculated to include both "controllable" and "uncontrollable" production costs.

One of the most basic ideas which cost control advocates advance is that costs must be accumulated in categories which correspond with organizational set-ups in terms of authority and responsibility. The shop foreman, the departmental superintendent, and the production manager must be made aware of their cost responsibilities and kept informed of their performance in their individual responsibility areas.

The effort to accomplish these objectives often takes the form of classifying overhead costs in categories of "uncontrollable" and "controllable" items. The problems of determining who is responsible for control of specific items and when control may be effected are important.

If every cost item could be traced to one and only one individual the problem of assigning costs for control would be simple. However, this is seldom the case. The shop foreman may be directly and solely responsible for use of manufacturing supplies but the purchasing agent is also involved since he selects the vendor and negotiates the price. The department superintendent may be responsible for utilization of indirect labor, yet he is not completely free to lay men off at will because of an over-all personnel policy which is established under the personnel director in view of the general economic climate and the firm's position in the industry and relationship with labor groups. The works manager may be responsible for the machine layout of the plant and the routing of work to utilize various fixed plant facilities and

therefore, it would seem, responsible for depreciation of machinery, but he may have had only slight influence on the determination of what machines to acquire and no voice in the selection of a depreciation policy.

At one extreme it may be held that only overhead costs for which a specific individual may be held responsible should be assigned to activities and to products. This procedure would eliminate the possibility of "buck-passing." It would enable higher levels of management to evaluate supervisory personnel on a relatively objective basis. It would, on the other hand, allow large amounts of overhead costs to go relatively unnoticed. It would not encourage over-all cost consciousness throughout an organization.

Although responsibility arrangement is relevant to the assignment of overhead costs, it must not be the sole determinant of it. Many, if not most, overhead costs carry joint responsibility. In providing over-all cost consciousness and maximum efficiency motivation, it is better to allow cost assignments to be based upon partial responsibility or even to allow some overlapping of responsibility centers than to exclude overhead costs because of joint responsibility situations. The danger of employee frustrations (and reactions not in the interest of over-all cost control) resulting from the assignment of overhead costs based on partial responsibility may be offset by informal higher level management interpretation of reported performance data. To exclude

joint responsibility items from functional and product costs negates the possibility for control of many types of costs.

Another facet of this matter of association of controllable and uncontrollable costs is that of the time period required to effect remedial action. It is often argued, for example, that fixed costs such as rent, depreciation, insurance, taxes, and salaries should not be assigned to activity centers and products because there is no immediate action to be taken to change such costs, or as often stated,"these costs are fixed and thus uncontrollable."

Costs differ in terms of the ease and immediacy with which remedial action may be taken to decrease them; but actually, there is no such thing as an uncontrollable cost. Depreciation, insurance, and taxes cannot be decreased without disposing of the tangible assets upon which they are based. Salaries cannot be curtailed without drastic measures and perhaps lengthy deliberations. Nevertheless, these costs are results of deliberate actions of the past, and future costs of these sorts will be the result of current decisions. The time lags between decisions and resulting cost incurrences, and the reporting of deviations and the taking of corrective action should not be allowed to dull the responsibility assignment of costs. Changes in responsible personnel may hinder the effectiveness of control of these costs but departmental and product assignments should be made to encourage at least an awareness of the significance of relatively inflexible cost commitments.

Although it is dangerous to generalize in an area which involves many and varied circumstances and, in any case, in one which hinges upon unpredictable employee reactions, it appears reasonable to suggest that for control purposes product costs and activity costs should include all types of overhead costs. The ease with which control may be effected and the degree to which corrective action is feasible, in terms of both individualized responsibility and the time required for taking action, must be reflected in the attitudes of those who interpret performance levels, but to provide potentially maximum motivation for cost minimization an awareness of total overhead costs is essential.[1]

In order to motivate individuals to perform at high efficiency levels a record of performance must be made available to them and benchmarks against which their individual effectiveness may be measured must be provided. Standard overhead costs provide these benchmarks. An important problem is that of determining, at least in a

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[1]This position is not shared by many writers in this area. One author states, for example, "normal operation of the business is accompanied by expenditures for taxes, insurance, watchmen, general factory office salaries, etc". . . . These "scarcely come within the sphere of the average foreman in the shop. He is not responsible for their magnitude. Therefore they should be excluded from the comparison of actual and standard costs that is used to measure his performance." Stanley B. Henrici, Standard Costs for Manufacturing, (New York: McGraw-Hill Book Company, Inc., 1953), p. 34. At another point, however, Henrici suggests a "sterner approach to standard costs used for control" . . . whereby "every effort should be made to eliminate the fixed nature of expenses, so that total costs will decrease in the same ratio as the decrease in production." Ibid., p. 38.

general way, the level of efficiency and the extent of plant utilization to be assumed in devising overhead standards.

The rationale for setting efficiency standards for overhead costs is basically the same as it is for material or labor costs. There does not appear to be any well defined school of thought as to the level of efficiency to be used.[1] Writers in this field and practitioners seem to range in their judgments from an average or anticipated level of efficiency to what may be thought of as an ideal or near perfect performance.

The use of estimated overhead costs in the determination of charging rates tends to encourage self-satisfaction which will not provide a spur toward improved efficiency. It may, in fact, encourage soldiering on the job and actually deter the exploitation of new and improved methods.

At the other extreme, idealistic efficiency standards for overhead are likely to weaken the confidence of departmental foremen in the over-all effort to minimize costs. They may actually cause resentment

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[1] This lack of uniformity of concepts of level of efficiency standards is caused at least in part by the many purposes for which standards are devised. Too often concern is for the determination of a single set of standard costs which is to be used in the formal accounting system and is to serve for inventory valuation, income determination, budgetary planning, pricing, cost control, work incentive, and many other functions. These varied purposes require different concepts and each may require different concepts under different operating and economic circumstances. Standards used tend to reflect relative emphasis that is placed on these many functions.

on the part of responsible employees that may cause all efforts at overhead cost reduction to fail.[1]

Efficiency standards for overhead should, for purposes of motivation, be set at a level which offers some challenge, yet at a level which may be attained by those who extend themselves. They should be established to reflect capabilities of responsible persons involved and estimates of potential improvements of departmental efficiencies.

Another aspect of the building of overhead standards as a motivating device relates to the activity base used in the calculation of rates. The answer here depends upon the circumstances surrounding a given situation. If the responsible person has some freedom to increase or decrease plant facilities under his control or to change the quantity of goods produced in his department, overhead rates should reflect a reasonably high level of volume so that some challenge is presented.[2]

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[1] A significant factor in this connection concerns the participation of responsible employees in the setting of standards for their own activities. If a superintendent or foreman is willing to establish an overhead standard for his own operation at an idealistically high efficiency level, this is surely all to the good. Care must be taken, however, to assure that an exceptionally tight standard is not forced upon an employee who does not concur as to its reasonableness.

[2] The mechanics for accomplishing this effort are sometimes envisaged as choosing between the recognition of some costs as being fixed or the inclusion of such costs in standards as if they were variable. Henrici states that when economies are most urgently needed, "supervisory efforts should be stimulated to the utmost, and standards should furnish the greatest incentive for high efficiency. Therefore the standards should not consider fixed expenses as such but should incorporate them on a wholly variable basis, in order to point the way to essential cost reductions." Henrici, op. cit., p. 39.

If these circumstances do not exist, little can be expected to be accomplished in this area at the department level, and it may be better to use expected volume in order not to cloud the picture and possibly encourage detrimental means of accomplishing the goal.[1]

Exception Data

To give strength to motivation provided by standard overhead costs of products or functions, a comparison of actual performance with standard performance is essential. This comparison yields accounting by-products in the form of cost variances that are important in the control of costs. These cost variances serve to focus management's attention upon particular areas where corrective action may be most productive. They provide the basic data for "control by exception."

To consider standards for meaningful variance data may seem simply to view "the other side of the coin" in relationship to standards used as motivating devices. Yet a look at historical results in the form of exception data may provide a supplementing point of view for justifying overhead standards.

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[1] When overhead rates are based on direct labor costs or direct labor or machine hours the shop foreman may sometimes be tempted to discourage efficiency in order to increase the activity base and by so doing increase the absolute amount of the overhead standard for his operation. This practice may be discouraged by emphasizing efficiency standards in terms of direct labor or machine hours and by vigorous policing of efficiency variances.

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The use of standard overhead rates to associate costs with products provides three basic types of variances; namely, a budget variance, a volume variance, and an efficiency variance. These three variances and their relationship to overhead costing concepts are considered in the remaining paragraphs of this chapter.

The overhead budget variance,[1] sometimes referred to as an expense or spending variance, is a measure of the deviation of actual overhead costs from the overhead costs budgeted.[2] It is often the basis for prompt corrective action. It is in many situations looked upon as the most important component of the total variation of overhead costs from standard.

Some thirty or forty years ago when standards were first being used, overhead budgets were prepared and standard rates were determined based upon production forecasts for the budget period. The budgeted overhead was thus related to anticipated volume. Variances from the budgeted amounts reflected the combined effects of inefficiencies and deviations of production levels from those forecasted. Since

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[1] Throughout this chapter comments may imply an assumption that all variances are unfavorable. Although this is the most likely situation, it is recognized that favorable variances may result. This recognition does not change the basic conclusions.

[2] In many accounting systems the budget variance is limited to production costs and activity levels are measured in terms of goods produced. In a less formal manner, selling overhead costs may be budgeted in terms of products sold and additional overhead variances may be determined.

these two factors are subject to differing degrees of control and since they usually represent responsibilities of different management personnel, these variances had limited usefulness in the area of cost control.

This weakness of the fixed budget for overhead costs has been met by the development of flexible budget techniques. Flexible budgets make it possible to relate overhead costs incurred with amounts budgeted for the activity level attained so that budget variances may be viewed as costs of inefficiencies unaffected by volume levels.

There are two general methods of preparing flexible overhead budgets. One that has been enthusiastically advocated during the past ten years involves a separation of all overhead costs into categories of fixed and variable items. Those items classified as fixed are assumed to be fixed through the range of activity levels which are to be expected, while those items classified as variable are assumed to be constant per unit of activity or changeable in exact proportion with changes in production levels. The budget, as such, may be set up in aggregate terms for the level of activity used in the determination of charging rates. Flexibility is provided simply by the classification of overhead items.

The second method of preparing flexible overhead budgets involves the determination of a series of budgets at arbitrary intervals of possible production levels. Budgeted amounts for the production levels attained may then be determined by straight-line interpolation between bracketing budgeted levels.

The use of fixed and variable classifications for budgeting overhead has merit in its simplicity and in its convenience for making crude calculations of incremental or marginal overhead costs, of break-even points, and even more crude calculations of out-of-pocket costs. It suffers from the restriction to straight-line cost patterns. Its simplicity itself may be a detriment by discouraging efforts to study individual cost behaviors and the propriety of detailed standard allowances.[1]

The use of multiple budgets indicating budgeted amounts for various possible activity levels is somewhat cumbersome. It does, nevertheless, encourage management to investigate in detail the manner in which various items of overhead costs should respond to changes in activity levels with no pre-conclusion of a straight line pattern. Consideration of time lags, of the activity level from which changes are to be made, and even of secondary causal factors[2] is encouraged.

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[1] In a recent article one author finds fault with the division of costs into fixed and variable categories and suggests in their place at least six groups of patterns of cost and volume relationships; namely, "(1) not related, (2) related to amount of capacity provided, (3) degree of variation clearly a function of percentage of capacity of operation, (4) obscured by time lag, control basis, or accounting, (5) uneven surge costs, and (6) inadequate capacity costs." Rolfe Wyer, "Replacing the Myth of Fixed and Variable Costs," N. A. C. A. Bulletin, (November, 1956), p. 359.

[2] An example of a secondary causal situation involves the fall-off of volume to a point where production runs of a particular item must be shortened. The diminution of volume is the initiating factor which causes additional set-up costs, but the shortening of production runs, although a secondary causal factor, is the crucial determinant of set-up cost behavior.

Overhead budget variance calculations are just as accurate as, and no more accurate than, overhead budget figures. If restrictions are to be placed upon overhead budgeting techniques by the use of delimitive classifications such as fixed and variable groups it should be done with an awareness of the possible degree of error and the significance that such a degree of error may have on effective cost control.

When one considers the usefulness of budget variances and the interpretations to be made of them in the control of overhead costs, it is natural to be led to the need for strict (tight) overhead efficiency standards. This tendency, in fact, may be greater than it is in the establishment of standards for efficiency motivation as has already been discussed. It seems reasonable, nevertheless, that in most situations a high but attainable level of performance may suffice for both purposes.

A point which has not been recognized to any great extent in practice is the need for engineered overhead efficiency standards to replace benchmarks which are based solely on historical records of overhead costs. Just as in the case of material and labor costs, management should know the deviation of actual overhead costs from what they should have been rather than the deviation from what they actually have been in the past. A knowledge of what overhead costs of the past have been should be only a partial guide for determining what they should be in the future.[1]

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[1]This point is well made by Rolfe Wyer. He states: "Clearly,

The overhead volume variance, sometimes referred to as an activity variance or an idle time variance, is a measure of overhead cost deviation from standard caused by the failure of activity level to reach that level which is implicit in the overhead charging rate. If overhead budgets are set up in terms of fixed and variable costs, the volume variance is usually computed as the product of the idle activity units and the standard fixed overhead cost rate per unit. In any case, it may be computed as the difference between the budgeted overhead for the activity level attained and the product of the overhead charging rate and the measure of the activity level attained.[1] The amount of the variance is thus a function of activity and the standard overhead

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accurate determination of how a cost should vary with volume is an engineering task rather than a matter of accounting. The fact that adequate control bases cannot always readily be found for indirect costs does not force the conclusion that they can be controlled only through past experience by a generalized, inaccurate control base. They, too, can be engineered." Rolfe Wyer, op. cit., p. 355.

[1]The following example may serve to illustrate this calculation:

1. Normal activity level	10,000 hours
2. Overhead budget at normal activity level	$20,000
3. Overhead charging rate--(line 2 divided by line 1) or $20,000 divided by 10,000 hours	$2.00 per hour
4. Actual activity for the current period	8,000 hours
5. Budgeted overhead for the activity of the current period	$17,200
6. Volume variance--/line 5 less (line 4 times line 3)/ or $17,200 less $16,000	$1,200

charging rate. The standard overhead charging rate, as far as fixed costs are concerned, is a function of the activity level used in its calculation.

In Chapters III and IV, concepts of overhead costs of products based on average activity and practical capacity absorption methods and the direct costing procedure were considered for income determination purposes. These three concepts also provide a framework for viewing the usefulness of volume variances in the control of overhead costs.

Average activity rates charge overhead costs to products in an amount sufficient to include in product costs the total budgeted fixed overhead costs over an extended time period. Volume variances are, in such cases, measures of departures from averages. They may emphasize to management the range of activity level variations from the mean level, but they do not show possible needs for improvement. They may, in fact, encourage management to interpret them as seasonal or cyclical fluctuations caused by artificial phenomena which, almost by the laws of nature, tend to work themselves out over the long run. Such an interpretation may prove fatal to any business.

Volume variances resulting from the use of average activity levels are nearly useless. They do not represent deviations from benchmarks which are in any sense standards. They are simply a result of the accounting techniques and the historical activity levels of a

particular enterprise. If average activity levels are used to charge overhead costs to products, supplementary methods should be used to keep management informed of economies which can be enjoyed only by increased exploitation of physical and manpower facilities which give rise to fixed cost commitments.

The direct costing procedure provides the example of the opposite extreme to complete absorption as far as volume variances are concerned. By this procedure only overhead costs classified as variable are associated with products and no volume variance is produced. Total fixed overhead costs are displayed as an amount which must be covered by product margins before profits result, but no measure of cost of failing to attain an established production level is provided.

Although advocates of direct costing emphasize its usefulness for understanding profit-volume relationships, it does not provide a needed reminder to management of unproductive costs resulting from idle facilities. It may cause so great a reliance on differential cost analysis that a tacit perpetuation of unnecessary fixed costs may result. As suggested in the case of average capacity absorption, the direct costing procedure, if used, should be supplemented by techniques to assure an awareness of costs of idleness.

In order for volume variances to reflect overhead costs of idleness and, therefore, possible advantages to be gained from increased volume, overhead rates should be established at a high level of

utilization of plant and manpower facilities. Conceptually such a level might be envisaged as a 168-hour week for 52 weeks each year. Such a concept might, indeed, provide interesting volume variance statistics.

Since, however, there are usually substantial offsetting costs[1] of operating at such a theoretical maximum level, and since often it is management's desire to operate at a considerably lower level in spite of profit motivation, this capacity is seldom if ever used. The practical capacity level is determined as a practical departure from this theoretical maximum. It makes allowances for management's desires and for inevitable but not altogether predictable losses of time due to production complications, but it does not reflect in any way the market potential of the company's products. It may be explained as the level at which the company would operate if there were no problem of obtaining sales orders.[2] It is a function of the size and capabilities of physical and manpower facilities.

When the practical capacity concept is used in charging overhead

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[1] Overtime and shift differential premium costs and costs of inefficiencies caused by the use of marginal equipment and employees may justify management's acceptance of operating levels lower than a theoretical maximum.

[2] This definition, although perhaps satisfying if viewed superficially, is subject to criticism. In a typical setting management's problem of obtaining sales orders is dependent to a considerable extent upon product pricing policies. The problem of obtaining sales orders is therefore what management chooses to make it. At low prices there may be no problem and at high prices the problem may be serious.

costs to products the volume variance represents a cost of unwanted idleness. It is the measure of the failure to obtain management's concept of an optimum exploitation of fixed resources. Here is to be found a useful reminder to management.[1] In order to develop meaningful volume variance data a high level of activity, or that often referred to as practical capacity, appears to be the most appropriate activity basis for overhead costing of products.

When overhead costs are associated with products based upon actual activity measures, overhead variances are limited to budget and volume variances. In other cases where standards are established for the activity measure in relationship to the amount of production, overhead efficiency variances are produced. These variances represent deviations of standard overhead costs for production levels attained from the standard overhead costs of products produced. They are usually computed as the product of standard overhead rates and the excess of the actual activity level over the standard activity level. The problem of whether overhead costs should be associated with products

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[1] The usefulness of volume variance information is sometimes questioned. It is sometimes called an uncontrollable variance. The attitude implied by the term "uncontrollable" is surely unreasonable. In most situations the idleness which produces volume variances cannot be corrected quickly, but there are many courses of action which may be considered and which may eventually bring favorable results. Prices may be cut, additional sales effort may be applied, new distribution channels may be established, new products may be developed, old products may be redesigned or repackaged, etc. The existence of possibilities such as these justify the exposure of management to volume variance data, whether or not action is usually forthcoming.

based on an actual activity level or on a standard activity level reflected in goods produced hinges, at least in part, upon the usefulness of these efficiency variances.

At the conceptual level the matter is hardly subject to argument. Overhead efficiency variances, or efficiency variances of any sort, are the primary tools provided by any standard cost system. With reference to overhead costs they provide a measurement of the productivity of physical and manpower facilities of many different types. They are indicators of the effectiveness with which production has been scheduled and carried to satisfactory completion. A rigorous policing of efficiency variances often proves fruitful. As pointed out previously it serves to discourage indiscriminate practices to minimize volume variances.

From a more practical viewpoint, the usefulness of overhead efficiency variances and interpretations to be given them depend upon the selection of a suitable standard unit and suitable efficiency levels from which deviations are to be measured. The productive standard unit used may be product units, standard labor hours, standard labor dollars, standard machine hours, or some other factor. As one author has pointed out, the unit chosen should (1) represent production, (2) be uniform in so far as possible, (3) vary with costs, and (4) be comprehensible to everybody involved.[1]

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[1] Stanley B. Henrici, Standard Costs for Manufacturing, (New York: McGraw-Hill Book Company, Inc., 1953), pp. 31-32.

With regard to level of efficiency it seems reasonable to reaffirm the position taken previously when considering budget variances, where it was suggested that a reasonably high but attainable level is appropriate. Henrici suggests that standards

> must be founded on engineering and statistical studies, together with historical data from a good system of actuals. The standard costs will then represent a sort of manufacturing heaven--distant, desirable, and yet attainable. [1]

Summary and Conclusions

Cost control advantages to be gained by overhead costing of products and functions are primarily available through the use of standard overhead costs. Such costs may be used to motivate employees and to provide useful variance data. In general, it is concluded that full standard overhead costs based upon a reasonably high performance level at anticipated volume provides the optimum motivation, at least at the lower echelons of management, and that a similar performance level at a practical capacity volume provides the most useful over-all variance information.

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[1] Ibid., p. 30.

CHAPTER VIII

SUMMARY AND CONCLUSIONS

In the foregoing chapters of this dissertation consideration has been given to a variety of concepts of overhead content of product costs from the viewpoints of a variety of objectives. It was felt that the problem area might best be considered in terms of varied objectives rather than in terms of varied concepts of product costs. Accordingly, the subject matter of the dissertation was organized in terms of objectives or purposes for which cost information is needed.

In Chapters I and II, an introduction to the problem and an historical background have been presented. The tracing of historical developments in accounting for overhead costs during the last three-quarters of a century provides an appreciation of the insight of accountants and engineers of the past into problems which confront accountants and engineers today in the overhead costing area. Prior to the last twenty years, however, little was done to encourage the development of a variety of overhead cost concepts for a variety of purposes.[1]

The problem of crystallizing concepts of overhead costs of

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[1] A notable exception to this statement is to be found in J. Maurice Clark's Studies in the Economics of Overhead Costs, (Chicago: The University of Chicago Press, 1923).

products as it exists today should be recognized to be many sided in nature. A logical first level breakdown of the problem seems to involve the objectives of professional accountants as opposed to the objectives of internal or industrial accountants and business managers.

Although the objectives and purposes of professional accountants and internal accountants and managers are in many instances similar, the special problem of calculating net income and determining financial position of business enterprises is peculiarly a responsibility of the professional accountant. He attempts to array financial data and present conclusions in numerical form in such a way as to provide suitable information for stockholders and creditors (both actual and prospective), the Securities and Exchange Commission, the Internal Revenue Service, and others. Historically, and certainly today, the professional accountant considers income determination one of his primary responsibilities. This aspect of the problem of overhead costs of products is treated in Chapters III and IV.

For income determination purposes, it is concluded that the matching of any and all overhead costs against revenues should be considered as potentially postponable. Natural classifications are not relevant to the theoretical problem of selecting costs to be deferred for matching against revenues. As a practical matter, however, it is doubtless better to treat deferred selling and administrative types of costs as special types of assets rather than as product costs. Product

units provide a satisfactory prop or hanger with which to associate production costs.

It is further concluded that for financial statement purposes a long-run planned level of plant utilization of facilities provides the most reasonable basis for the charging of production overhead costs to products. When this basis, or any other "normalizing" technique, is used, under- and overabsorbed balances may be expected to appear. The logic of the planned utilization basis leads to the suggestion that production overhead balances should be deferred, unless long-run planned activity levels are revised, since they are of a temporary nature. They are the result of accounting techniques which do not recognize incurrence of costs in accordance with the diminution of planned benefits to be received from fixed cost commitments.

In view of the many and varied concepts of proper association of overhead costs with products for financial accounting purposes it appears that the American Institute of Accountants should consider taking action to clarify accountants' position in this matter. It could surely encourage more strongly than it has in the past a more inclusive product cost concept. It might well consider also an attempt to reverse the current tendency of accountants to classify costs, with a substantial degree of arbitrariness, into product and period groups. This pigeonholing of costs in their natural classification forms should not be allowed to encourage members of the profession to lose sight

of the fundamental nature of the concept of net income in favor of the mechanical aspects of accounting procedure.

In Chapter V, a special problem of harmonizing profit forecasting techniques with techniques of calculating historical profits has been considered. Short-term profit planning and forecasting is a matter of much importance in modern business. The technique of profit forecasting using a break-even type of analysis is deficient when used in conjunction with conventional absorption costing procedures for income calculation, since it does not allow for recognition of the income effects of a run-off or a build-up of inventories of work in process and finished goods. To counteract this deficiency, concepts of break-even lines and general iso-profit lines have been developed. Diagrammatic presentations have been prepared and mathematical equations have been suggested to enable management to forecast reported net income as a function of both sales and production volumes. It is felt that the material of Chapter V provides an introductory commentary on a general type of technique which may possibly be extended further, especially by the use of mathematical types of analyses.

Although business managers are concerned with reported income figures and use them as tools in the making of certain decisions, management must make many decisions which require cost information of a particular type. Some of these decisions and product overhead cost concepts related thereto have been considered in Chapters VI and VII.

For product pricing purposes, management needs cost figures in terms of product units. An attempt to maximize profits by equating marginal costs and marginal revenues emphasizes the need for estimates of marginal costs. Although it is not usually possible to determine marginal costs, approximations of incremental costs may be of considerable assistance to management. In order to make such information available the accountant must study overhead cost behavior patterns and report to management the costs that will be different as a result of a given change of volume and the amount of their change. Management will often find incremental or variable overhead costing of products useful in the making of pricing decisions.

In order to appraise prices and profitability of various products or product lines, management also needs full long-run product cost figures which include allocations of all overhead costs. Such unit costs may prove to be useful also as benchmarks for the pricing of new products or any products for which the price competition and market demand are unknown. They provide some insight into likely competitor reactions to price decisions in an oligopoly situation.

The most useful single product overhead cost concept for pricing may depend upon the existing economic climate and the position of the company in the industry. The industrial accountant or controller may well consider it his responsibility to evaluate these matters and provide management with overhead costs of products which are relevant

in the particular setting. He should, however, take care not to pre-empt management's decision-making responsibility. In most cases he should make available to management alternative product cost figures with explanations of the nature of each and its relevance to the problem at hand.

Overhead costing of products and activities is of importance to management in the control or minimization of overhead costs. Considerations in this area are the subject matter of Chapter VII. Standard overhead costs are of particular importance in cost control. It has been concluded that standards set at a reasonably good but attainable performance level, and based upon planned activity levels usually provide maximum motivation for cost reduction. In order to provide management with significant and useful overhead cost variance information, overhead standards should be set at a high but attainable level so as to produce meaningful budget variances; rates should be based upon practical capacity operation levels in order to determine costs of idleness; and, overhead application should be made in terms of productive standard units to make available overhead efficiency variances.

This review of highly varied conclusions as to proper product overhead cost concepts for differing objectives may be somewhat disappointing to those who strive for consistency, uniformity, and definiteness in answers to perplexing problems. If there is one central thesis here, it is to urge flexibility and imagination in the devising of

product overhead cost concepts, and at the same time to urge the striving for proper concepts for specific purposes. If this is to be accomplished, the horizons of the accounting profession must be kept broad, and those of some professional accountants must be extended.

While there is much to be said for orderly, efficient, and effective record keeping routines, they must not be allowed to overshadow constructive thinking in the field of product costing for income determination, product pricing, cost control, or any other particular purpose. R. L. Dixon, then a member of the Committee on Cost Concepts and Standards of the American Accounting Association, has stated:

> Since the income determination function . . . must be a continuous function, it appears certain that the accounting system should likewise be designed to provide for regular reporting of the profit-making results. [1]

Accounting systems may continue to be designed in this manner, but it does not seem reasonable to insist that they must necessarily be so constituted. The accountant should be willing and able to set up procedures which will make possible with the least amount of effort the accumulation of sufficient cost data to determine net income with the least amount of effort and provide needed tools for the making of a multitude of types of management decisions. The precise focal point of recording routines has little relevance.

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[1] Robert L. Dixon, "Cost Concepts: Special Problems and Definitions," The Accounting Review, (January, 1948), p. 40.

Accountants, both public and private, should be receptive to tailor-made cost data. There should be no principle of such importance as to inhibit the accountant in his quest for useful cost information. H. T. McAnly has stated:

> We should expect to apply the same general concepts and follow the same general classifications and procedures in developing costs for profit determination as we use in developing costs for planning and control.[1]

Although the language used in this quotation is not as definite as it might be, Mr. McAnly implies strongly that a single set of concepts serves equally well for almost all purposes. On the contrary, there is no reason to presume that associations of overhead costs with tangible units of product for purposes of measuring net income should suffice for the wide range of decisions that business managers must make, nor that management decisions may all rely on the same product overhead cost concepts. Cost information must be adapted to the particular objective for which it is being determined.

To those who have difficulty in visualizing many and varied answers to the question, "how much did this product or service cost?" Mr. Noyes has stated the situation in an interesting and enlightening way as follows:

> the technological process, in its widest sense, is the medium through which product comes into being as the real consequence of its real causes. There is no product without sufficient cause. We have, then, to attribute it to its real causes . . . the particular

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[1] H. T. McAnly, "Putting Cost Accounting to Work--For Profit Determination and Inventory Valuation," N. A. C. A. Yearbook, 1946, p. 132.

costs of production of a particular batch of products must be accepted as technical data. They cannot be assorted to taste; they cannot be ruled in or out on institutional grounds; they cannot be treated as relative to the points of view of various schools of thought. They are facts which are 'given' and which may only be revealed by observation and inference.

It is said that there are different costs for different purposes. The implication is that the allocation of costs of production is not a matter of fact but a matter of discretion. . . . It is chiefly loose language or loose thinking; for what is meant is that, under various contingencies which may arise in connection with the processes of production, decisions by those responsible may be made without taking account of all costs or even with reference to one or two categories only. That does not alter the facts of costs. It does not make the items ignored or forgotten any the less costs. It is merely a way of concentrating attention on the strategic factor in the case. [1]

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[1] C. Reinold Noyes, "Memorandum on Costs in Relation to Output," an appendix to Joel Dean's "The Relation of Cost to Output for a Leather Belt Shop," Technical Paper 2, (New York: National Bureau of Economic Research, 1941), pp. 60 and 65.

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