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THE NATURE AND FUNCTION OF FUNDAMENTAL PROPOSITIONS IN ACCOUNTING THEORY CONSTRUCTION

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Accounting scholars such as Chambers, Ijiri, Mattessich, Moonitz, and Sterling emphasize the central importance of fundamental propositions in accounting theory construction. Theory building in accounting has proceeded, however, without the insight provided by delineation of the respective natures and functions germane to different types of fundamental propositions. Accounting theorists have not gone far enough in identifying the unique roles of the various statements used as basic assumptions in theory construction. Accordingly, premises, axioms, and postulates are differentiated in harmony with philosophic substance. Premises are closely linked to systems of formal deductive logic and the inherent processes of valid inference. Axioms are used in theoretical systems to specify the formal aspects of theories. Taken together, axioms define the formal structure or syntactical aspect and the formal interpretational rules or semantical aspect. Postulates explicate nonformal aspects or subjective dimensions of theoretical systems. They capture the essential imperatives or obligations of theory building in a specific field and are, thus, normative in nature. Ijiri's axiomatic accounting system is chosen as a vehicle to illustrate both the unique roles of axioms and postulates as well as the complementary nature of these two types of fundamental propositions in accounting theories. Ijiri's system contains three axioms which are patterned after Euclidean geometry in a manner similar to theoretical systems in natural sciences. Nonformal postulates are added to this axiomatic system and are shown to perform a different, but supporting function.

† † †

INTRODUCTION

Fundamental theoretical research in accounting has been accorded high priority since the reorganization of the American Institute of Certified Public Accountants' (AICPA) research effort in 1958. At this time, the Special Committee on Research Program recommended to the Council of the AICPA the establishment of a research staff whose immediate research priorities were envisioned as:

. . . a study of the basic postulates underlying accounting principles generally, and a study of the broad principles of accounting. The results of these, as adopted by the [Accounting Principles] Board, should serve as a foundation for the entire body of future pronouncements on accounting matters (1958:64).

The quantity of continuing research subsequently directed toward delineation of the foundation of accounting (variously referred to as basic assumptions, premises, axioms, or postulates) indicates the importance attached to funda-

mental research by accounting scholars (see Buckley, Kircher, and Matthews, 1968:276-279). Chambers (1960), Ijiri (1965), Mattessich (1972), Moonitz (1961), and Sterling (1970) all emphasize the central importance of fundamental propositions to accounting. Similarly, the American Accounting Association's Committee on Accounting Theory Construction and Verification (1971) and Committee on Foundations of Accounting Measurement (1971) accord fundamental research a critical role in accounting theory development.

Unfortunately, despite all the attention devoted to identification of fundamental propositions in accounting, the visible results are meager. In fact, a considerable degree of disenchantment and skepticism surrounds research of this type in accounting circles today. Such disenchantment and skepticism do not stem from relegation of fundamental research to a role of minor significance in theory construction; rather, it results primarily from the inability of the research to identify broad, serviceable fundamental propositions. Delineation of the natures and functions of different types of fundamental propositions is an important first step in providing accounting theories with a systematizing framework.

NATURE AND FUNCTION OF FUNDAMENTAL PROPOSITIONS

Throughout accounting literature, the terms "assumption," "premise," "axiom," and "postulate" tend to be used interchangeably. The thread linking these terms is their common level of conceptual abstraction which places them at the very foundation of fields of theoretical knowledge. Correspondingly, the characteristics of consistency, coherence, contributiveness, independence, completeness, and economy are widely recognized as being the requirements to which such propositions must individually and collectively adhere in order to be accorded fundamental status. Of these above, two require further elucidation. The characteristic of coherence is an extension of the characteristic of consistency. Consistency is traditionally associated with systems of formal logic and mathematics. However, in about 1930, Gödel demonstrated that even within a formalized deductive system, strict consistency is impossibly rigorous (Stabler, 1953:146, 251). Fortunately, the concept of derivation led to a more flexible interpretation of the characteristic of consistency. Derivation encompasses both the deductive rules of formal logic as well

as the problematic rules of induction. Consequently, "any extension of . . . deduction to the concept of derivation has to be accompanied by an extension [of the requirement] of consistency to [the requirement of] coherence" (Leinfellner, 1974:14-15). Coherence is a broader, more flexible, requirement than is logical consistency (Edwards, 1967, 6:476). The requirement of coherence admits "highly" confirmable, probable propositions to a system and allows for systematic relationships of a statistical nature between propositions of the system. Coherence demands only conceptual tractability which can be either deductive or probable (Leinfellner, 1974: 15).

Of these six characteristics, some are essential while others are only desirable. Taken together, however, they comprise the necessary criteria for identification of fundamental propositions. It does not follow, however, that these terms may be used interchangeably. On the contrary, their indiscriminate use fails to recognize useful distinctions in their respective natures and functions (for a detailed discussion of these characteristics or requirements, see Langer, 1953; Eves and Newsom, 1965; Stabler, 1953; Queenan, 1962; Mautz and Sharaf, 1961; and Lambert, 1973).

Assumption

An "assumption" (or basic assumption) is a proposition that is taken for granted. It is the most general or most primitive of the four terms. Operationally, this means that in the definitions of the other terms, "assumption" is used as a descriptive word (for example, the term "postulate" is defined as an assumption which . . .). The terms "premise," "axiom," and "postulate" denote special types or specific interpretations of "assumption."

Premise

A "premise" is an assumption which forms the starting point in logical argument. Rules of deductive logic are applied to premises to reach logically valid conclusions. Thus, the term "premise" is associated with systems of formal deductive logic and their inherent processes of valid inference (Barker, 1974:6-7).

Axiom

An "axiom" is an assumption which specifies a relation (function or operation) which is permissibly applied to the elements (sets or properties) of the system. Axioms explicate the *formal* aspects of a scientific theory. Taken together, they define the formal structure (syntactical aspect) and the formal interpretational rules (semantical aspect) of a theory (Leinfellner, 1969:110-20). In short, syntactical axioms capture the so-called "pure theory" which has no connection with the real world, while semantical axioms specify the meanings necessary to connect the syntactical structure with the real world.

Postulate

A "postulate" is an assumption which explicates certain *nonformal* aspects or subjective dimensions of a system. Aristotle introduced postulates of reality, evidence, truth, deduction, a priority, consistency, and explanation as non-formal propositions clearly distinguishable from the premises of logic and formal axioms (Leinfellner, 1966:199-203). Similarly, the *Dictionary of Philosophy* alludes to the non-formal nature of postulates in its definition of a postulate as an "indemonstrable practical or moral hypothesis, such as the reality of God, freedom, or immortality (Runes, 1960: 244).

Postulates identify relevant aspects of a discipline's environment. These aspects include both properties of that environment as well as inter-relationships between the environment and the discipline. Postulates provide the critical, background perspective needed to guide the theoretical systematization of a discipline. They isolate and explicate, in nonformal language, the essential imperatives or obligations inherent to theory construction in accounting; they create an awareness of critical biases, prejudices, and presuppositions which previously lay hidden, partially concealed, or entangled in the maze of empirical propositions characteristic of accounting.

Postulates are clearly differentiated from premises. However, the distinction between postulates and axioms is not as apparent. Ijiri's axiomatic accounting system provides a vehicle for illustrating both the unique roles of axioms and postulates as well as the complementary nature of the two types of fundamental propositions in accounting theories.

AN ILLUSTRATION DIFFERENTIATING AXIOMS AND POSTULATES

Ijiri's (1965) axiomatic system is one of the simplest and most concise explanations of historical cost accounting. The set of axioms is patterned after Euclidean geometry in a manner similar to theoretical systems in natural sciences. By examining current accounting practice and abstracting from these, Ijiri derives a system composed of three axioms and three measurement rules. The three axioms specify the syntactical structure or logical aspect of accounting in terms of elements and relations defined on those elements:

Axiom of Quantities: There exists an accounting set U , that is, a set of objects that may be partitioned into a countable collection of measurable classes.

Axiom of Ownership: The property set A of a given subject at any time t can be uniquely determined at that time or later.

Axiom of Exchanges: For any object that is added to or subtracted from the property set A_t , an exchange

that has caused the addition or subtraction of the object can be uniquely identified; and all exchanges that have occurred are identifiable, countable, and can be ordered completely and uniquely according to the time of their occurrence.

Essentially, these axioms assume that objects can be quantified via measurement, that the property set of a subject can be identified, and that changes in a property set of a subject can be recognized by means of exchanges.

Since accounting is an applied discipline, it must go beyond syntactics and also embrace meanings or semantics. Thus, the terms in the pure theory are given real world substance in accordance with the intended application of the syntactical structure:

Definitions:

i) A *subject* is any identifiable thing that is capable of owning other things.

ii) *Objects* are any identifiable things that are capable of being owned by a subject.

iii) *Time* is a real variable; a smaller value of time means an earlier time, and a larger value a later time.

iv) A *physical measure* is a non-negative set function that is defined on a class of objects and all of its subsets such that it is *countably additive*—it takes zero on the empty set—and that two sets of objects in a same class are substitutable if they are of a same value of the physical measure. A class with such a function is called a “measurable class.”

v) An *accounting set* is a set of objects that may be partitioned into a countable collection of measurable classes.

vi) *Ownership* is a well defined relationship between a subject and objects at a given time by which for any object it is uniquely determined whether or not the object belongs to the subject at the given time.

vii) A *property set* of a subject at time t is a subset of an accounting set and consists of all objects that belong to the subject at time t .

viii) An *exchange* at time t is a phenomenon at time t which results in adding a set of incoming objects (all belonging to a single class) to the property set A_{t+} and subtracting a set of outgoing objects from the property set A_{t-} , where $t^+ > t^-$ and $t^+ > t^-$.

Unfortunately, a number of critical propositions essential for guiding the development of accounting theory are not

captured and explicated by Ijiri's axioms. Such propositions comprise the postulate complementation or background perspective for accounting. While it is not practical in this paper to attempt a complete postulate complementation, four plausible postulates are offered to illustrate the function such propositions perform.

Postulate of Objective: The primary objective of accounting should be to provide information useful for making economic decisions.

Postulate of Logic: Accounting measurement should be embedded in a probability framework.

Postulate of Structure: Accounting measurement should be based on general systems theory.

Postulate of Human Abilities: Decision makers can differentiate between two non-identical sets of objects, can identify an object as belonging to a given subject, and can identify exchanges.

Essentially, these postulates add normative obligations to Ijiri's system in the form of an objective of accounting measurement and epistemological, ontological, and behavioral commitments. They illustrate the type of complementation which any pure axiomatic system must have in order to be completely effective as a framework for accounting. Such propositions provide essential perspective for both theoretical development as well as empirical confirmation. If these presuppositions are allowed to remain undetected in the empirical language, observations, meaning, facts, measurements, and experiments are likely to be distorted, inconsistent, and perhaps misleading. Additional postulates may be added to those presented, or others may be offered as alternatives. The important point is, however, that these fundamental propositions should be separated from the empirical language and distinguished in nature and function from syntactical and semantical axioms.

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