Time and space in income accounting

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Abstract

Inspired by the work of DR Scott, we explore the formation of an internal logic of income accounting that bestows upon the income accounting system an institutional status. As large scale modern corporations emerged in the market, imaginative ways of doing income accounting were developed and exercised in the 19th century. Creative accounting practices of the time were eventually evolved into what is now known to be the accrual process. A distinctive feature of the accrual accounting system, that has the accrual process as its essential part, is that it creates internal space demarcated (de-marketed) from the external world. In the demarcated space of the accrual accounting system, “the Emptying-out of Internal Transaction Time” takes place. Internal transactions enable the accrual accounting system to generate smoothed income series out of cashflow chaos, which function as an “attractor” in the complex relationships between managers and stakeholders. Creative accounting practices induced phase transition so as to establish the accrual accounting system as a legitimate social institution. © 2000 Elsevier Science Ltd. All rights reserved.

“Imaginary time is indistinguishable from directions in space. If one can go north, one can turn around and head south; equally, if one can go forward in imaginary time, one ought to be able to turn around and go backward. This means that there can be no important difference between the forward and backward directions of imaginary time. (Hawking, 1988, p. 143).”

Income has always been situated in the core of accounting discourse. The primary output of accounting is income figures which have been extensively utilized in everyday economic activities, not to mention as the basis of income distribution, for investment decisions, for tax purposes and so on. Accounting research oriented towards discovering a theoretically justifiable and unambiguous ways to measure income seems a never-ending endeavor, indeed. It might be that efforts to reflect “economic reality” in the measurement of income are ever lasting just because it is an impossible task to accomplish (Boulding, 1962).

Our concern in this paper is institutional: we explore the aspect of income accounting that constructs reality. We investigate the role of income accounting in constructing an intersubjective cognitive ground for communicative activities within and without (outside of) organizations. Inspired by the work of DR Scott, especially by The Cultural Significance of Accounts (1931) which in turn is influenced by the (old) institutional economics of Thorstein Veblen, we explore the internal logic of income accounting that bestows upon itself an institutional status.

The internal logic of institutions, as long as it is socially legitimized by its internal definitions, enables institutions to deploy resources for their

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own reproduction.¹ This is why we follow the definition developed by the institutional school of organizational studies (e.g. Meyer & Rowan, 1977; Powell & DiMaggio, 1991) that emphasizes the cognitive aspect of institutions, i.e. the taken for grantedness of reality, rather than functional definitions of institutions, e.g. that of new institutional economics (e.g. North, 1986; Williamson, 1975) that presuppose wealth maximizing individuals. From the institutional perspective, the objective–means relationship in particular situations is specified by the institutions rather than by the purposeful mind of rational individuals. Emphasizing the institutional aspect of accounting sheds light on the idiosyncratic set of rules embedded in the system.

1. Money, time and accounting

Modernity has emancipated the potential of the economy to the extent that the rules of market competition penetrate almost all dimensions of human life (Polanyi, 1944). The economy, which used to be embedded in the society, has grown to overwhelm the society in the modern world. Accounts for human actions have been provided in economic terms universally. This excrescence of the economy has been achieved not only by the expansion of market transactions but also by the development of hierarchical organizations. While the rules of the market economy have gained a new territory which used to be a sub-category of the rules of the society, those hierarchies within the economy have given birth to their own set of rules that have obtained a domain in the market (Chandler, 1977; Williamson, 1975).

Although we do take advantage of it in this paper, the dichotomous view that distinguishes hierarchies from markets is useful only to the extent that it clarifies the nature of rules that bind each individual action to the systems that it belongs to. This view would limit our understandings of the role played by accounting in human interactive processes if it were naively applied to the study of accounting. This is because as soon as the dichotomous view has become a part of the orthodoxy, it starts to conceal its origin in ideal types; consequently, the existence of markets and hierarchies is assumed instead of investigated.

In order not to fall into this pitfall, it is helpful to recognize that the dichotomy is based on networks of social relations. Since human actions are embedded in concrete, ongoing networks of social relations (Granovetter, 1985), there is a need to explore the way in which those networks of relations have become what they are. The deepening of the interpretative framework from the markets or hierarchies dichotomy to the networks of relations does not at all mean that comparative studies of the two systems are futile. It implies simply that we should not assume the ontological existence of hierarchies or markets. Instead of taking their existence for granted, we should investigate the cognitive ground for them to be socially constructed in human interactions.

This is where the relation between accounting and time and space comes in. The social construction of reality is continuously carried out in communicative interactions which necessitate various sorts of media by which communication becomes possible. Accounting in modern society is an important medium of communication, which inevitably influences the nature and course of communication itself.

In the modern economy which seems to have largely been emancipated from the rules of society, money has obtained a universal status as a carrier of time. It is no coincidence that the term “value” is redundant in the theoretical framework of mainstream economics, which endeavors to reflect the modern economy where prices are what value is all about. The positivists tacitly believe that there is no need for any hypothetical values (such as “scarcity value” or “use value”) other than price, not only when prices are given by the market mechanisms but also when explicit prices are

¹ Internal logic defines what the institution provides by specifying the object and the means (if there is any) of the institution in the normative sense. A sustainable internal logic should include a rationale and technology for the institution to reproduce itself. The autocatalytic process of the institution is a product of the internal logic. When a catalyst reproduces itself utilizing available resources in the process, it is called autocatalytic process (Prigogine & Stengers, 1984).
absent. Note that prices are indicated by nothing but by money, i.e. value in the economy is of monetary value. Money represents value, but money itself is empty. As neoclassical economics holds to a “veil-of-money concept,” money is a vanishing point in the theory of the market economy.

Various markets in remote places can be rationally reduced to “the market” because money is a medium of exchange between people who have never met before. Money performs a mediating role in the economy that makes market exchanges possible not only between different places but also between different times. Money links different points of time in two ways: physically and notionally. Physically, money saved now is purchasing power for the future as long as money holds its status in the economy. The material existence of hard currency over time performs such a function. Notionally, for instance, commodities of the future can be immediately sold, bought and settled in the futures markets with money. The value of time in an economy where money links different times and spaces is universalized, as it is decoupled from concrete situations in ongoing social interaction. In this sense, the price of money, of which long-term interest rates are a prime indicator, has become the standardized time value for the economy. Just as prices obtained in organized markets, such as stock exchanges, represent the standard value of commodities exchanged, interest on money represents the value of time in the economy. Diverse flows of time in society seem to be reducible or abstractable to the market where the standardized time value of money dominates.

However, the whole of economic life cannot be dominated by the market mechanism. Hierarchical organizations play a major role in the modern economy. Their development has been paralleled by the evolution of accrual-based accounting (hereafter the accrual accounting) system. We argue that the accrual accounting system has created a shared situational framework for actions and the coordination of actions of individuals within and without organizations. The situational framework needs to provide the axis of “coordinates” for the actors to locate themselves. A taken for granted set of rules that relates time and space provides the intersubjective ground for ongoing interactions. In other words, a sense of direction or non-direction is constructed upon the artificially created dimensions of time and space. Specific procedures instituted in the accounting system generate artificial spaces where time flows differently from the outside world, e.g. markets.

One of the major consequences of the situational framework created by the accounting system is the separation of organizational time and space from those of the market. However, the same accounting system unifies potentially diverse time-frameworks of managers and heterogeneous stakeholders. Managers, who should be concerned with the income generating capability of the going concern, need to have a long-term time perspective. Investors do not necessarily share the same long-term interests with managers in general. They are more likely to be concerned with the short-term profitability of their investments. The income distribution cycle is usually shorter than the income generating cycle. As we see below, the periodic income accounting system provides the ground for intersubjective understanding between the managers and stakeholders. On the one hand the accounting system insulates a place of an organization from market time by creating an artificial accounting space; on the other hand, the same accounting system mediates the two separated domains by providing “smoothed income” as a kind of “attractor” in the complex relationship between managers and stakeholders.²

2. The evolutionary process of accounting conventions

The evolutionary process of accounting conventions shows the path, which is only one of those that might have been taken, by which the accrual accounting system has obtained a socially legitimized status. For the purpose of this paper, we have divided this process, as it evolved over the

² When a dynamical system’s trajectory does not move through all the possible parts of a successive time space, but instead occupies a restricted part of it, we have “attractors.” In a complex system for which a linear description of the system is not possible, strange attractors are sometimes observable.
last five centuries, into two periods: we call them the pre-going concern and the going concern periods, because during the transition between the two periods, the accrual process has been incorporated into the income accounting system, which in turn facilitated accounting obtaining an institutional status in society.

2.1. The normative character of accounting conventions

Although any formation of conventions and choices of conventions necessarily involves individual actions that are often interpreted as results of the subjective judgments of individual actors, which might as well be called rational choice, some conventions obtain a rule-status in society, and are sometimes called norms. These norms are achieved without any explicit human intentions or interventions or design. This paradox of individual actions resulting unintentionally in the formation of social institutions has been often interpreted in the framework of a natural selection that has a distinctive flavor of methodological individualism (Vanberg, 1986).^3^ However, there is another tradition of thought that emphasizes the internal logic of such institutions. The alternative tradition of thought is influenced by phenomenology and emphasizes that reality is socially constructed. It asserts that it is the ability of institutions to reproduce themselves recursively that gives them meta-individualistic status. The reproductive ability of social institutions depends not only on environmental factors but also on their internal logic as a catalyst for the reproductive process.

A certain set of accounting conventions in the modern economy has obtained a legitimacy of its own that can be used not only to legitimize decisions or actions of organizations but also to legitimize the status of organizations themselves as sovereign individual entities. The agenda that we address in this paper is the further inquiry into the internal institutional logic of accounting that helps to construct reality and reproduce itself by constructing reality. We argue that the built-in logic of the accrual accounting system plays a vital role in constructing the reality of organizational and inter organizational activities as it is closely related to the issue of time and space.

2.2. Pre-going concern

Early venture (limited term) business typically employed total income accounting, by which total income from establishment till liquidation was calculated. Total income accounting had no concept of accounting periods. There was no need for the concept to take place in accounting calculation, since total income was calculated over a material lifetime of the venture business which was given exogenously to the accounting system. The accounting system was based on the actual amount of cash obtained and paid (receipts and expenditures) within the total lifetime of the venture business concerned. A typical case of such practices was “one voyage–one accounting.” In early venture businesses, accounting income was determined completely by the market in this way. According to Scott, “in the field of merchandising in which accounting first developed, the scope and function of accounts were limited, in the beginning, to recording decisions rendered by the market,… Accounting was, thus, entirely subordinated to the market…” (Scott, 1931, p. 197).

The embryonic stage of a modern corporation with going concern status carried properties similar to those of early venture business, though they introduced artificially partitioned accounting periods for periodic income calculation. This “equi-temporal accounting” was not yet based on accrual but on contemplated cash flows. For instance, some going concern enterprises included the holding gain and loss on operating assets unsold at the end of each accounting period in profit and loss accounts by assuming as if those assets had been sold at the marketable value at the

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^3^ The principle of methodological individualism involves the recognition that “all actions are performed by individuals and a social collective has no existence and reality outside of the individual members’ actions” (von Mises, 1949, p. 42, cited also in Hodgson, 1988, p. 56).

^4^ Evolutionary theory is not necessarily based on atomistic ontology as was the case in Spencer Hodgson, 1993, pp. 87–89 and Sumner Paul, 1988, pp. 261–269. Chaos theory, which is not a version of reductionism, shows affinity to evolutionary studies.
time concerned. In this case, the marketable value of the unsold stock could be regarded as “uncollected sales.” In terms of the autonomy of the accounting calculative logic, it was still subordinated to the logic of the market, i.e. the market price fluctuation was immediately reflected in the periodic income.

2.3. Going concern

In 19th century England and Scotland, modern corporations emerged that developed periodic income accounting that fit a larger going concern. From this stage on, the internal calculative logic of the accounting system has been structurally separated from the external logic of the market. We will argue this point further on in the following sections. The accounting system that begun to embrace its own internal calculative logic is now called the accrual accounting system.

The accrual accounting system allocates income earning cash inflows and outflows as periodic revenues and expenditures. The allocation process was dictated by its internally specified logic (generally termed as accrual-basis), independent from the external market conditions. It is worth noting that the income smoothing accounting practice was extensively developed about the same period when accrual concept emerged (Mathews & Perera, 1991, p. 228). This accrual process has evolved as aggregated consequences of the “creative accounting” of the period.5

Since periodic income has been created by nothing but the accrual accounting system, and economic interactions require this periodic income, it was only necessary for the accrual accounting system to obtain legitimacy for it to become a social institution. Besides appreciating the actual efforts made by the propagators of the accrual accounting system as well as the other reasons that have contributed to accounting’s institutionalization, it should be emphasized that periodic income has been self-reproducing, once it was created and exploited socially. Periodic income is calculated as a basis for income distribution because periodic income is accepted as periodic income by one person because he or she knows that periodic income is accepted as periodic income by others.6 In this way, periodic income becomes a de facto common ground for the interactions within and without organizations.

The self-reproducing process is not eternal, however. The sustainability of the process depends both on the availability of resources, and on the rigidity and immunity of the internal logic that provides the rationale and the technologies of its existence. Understanding the idiosyncratic nature of accounting’s internal logic is a prerequisite for answering these questions. because the core of the reproduction process is the accrual process incorporated in income accounting.

3. Implicit assumptions on time in accounting conventions

The accrual accounting system is an income accounting system that incorporates the accrual process. The distinctiveness of the system can be summarized from the dimensions of time and space. The dimension of time is investigated in this section. Then in the next section the dimension of space in the accrual accounting system will be analyzed.

Assumption 1: The Constant Value of Money (The Indifferentiating External Transaction Time). When it comes to valuation of money in the accrual accounting system, the “constant value of money” assumption is what comes to mind for accountants. It is true that the purchasing power of money must be assumed constant throughout accounting periods, however fictional, in order for the consistency of accounting calculation to hold, unless we introduce some sort of inflation accounting or the like. In the case of accounting

5 Thomas (1969) concluded that it is impossible to know how expenses could be matched against revenues. His conclusion was derived because it was assumed a priori that the objective reality exists outside of accounting and accounting discourse. See Manninen (1996) on this point. We contend that reality is constructed upon accounting as a social institution which is an epistemic phenomena.

6 Money is another example of social institutions that have self-reproducing properties. Money is money because it is accepted as money by one person who presumes that others accept it as money as well.
for changing monetary value, it is simply that we replace one fiction of monetary value, i.e. constant value of money, by another, e.g. inflating or deflating by general price index.

The assumption of the constant value of money is not unique to the accrual accounting system, because the same assumption is also shared by historically preceding accounting practices. The constant value of money assumption is a common assumption among all monetary accounting systems except for those that explicitly reject the assumption. For instance, total (cash) income accounting also necessitates the assumption for it to be consistent, otherwise, as a result of external transactions, each cash flow needs to be translated (inflated or deflated) by the changing purchasing power of money.

Time differences of external transactions are recognized through the value of money, since money is a universal carrier of time in the market economy. When value of money is assumed constant, we have no base to differentiate transactions that are identical except for the temporal difference. Therefore, we term the assumption an assumption of “indifferentiating external transaction time.” This assumption is held whenever the Law of Conservation of Undiscounted Accounting Income (Sunder, 1997, p. 67) holds.

Since the assumption of the constant value of money is defined in terms of the purchasing power of money, it should be understood within the context of transactions that involve money and goods and services purchased by money. This assumption is directly related to the material basis of economic transactions. Transactions that do not satisfy this criterion are, strictly speaking, irrelevant to the application of the assumption. This is critical for our argument that the accrual accounting system is capable of creating internal space independent of external time flows.

Assumption 2: The Constant Time Value of Money (The Emptying-out of Internal Transaction Time). By artificially partitioning continuous external transactions into accounting periods of a going concern, current accounting practices calculate periodic income as a “ganz unentbehrliche Fiktion (completely indispensable fiction)” (Rieger, 1928, S. 209). The resulting periodic income from this particular type of accounting practice would not be temporally comparable and consistent unless the temporal uniqueness of external transactions are ignored (Aggarwal & Gibson, 1989, p. 93). Eventually, the temporal uniqueness of external transactions has become ignored in periodical aggregated accounting (Chambers, 1989, p. 7).

The way periodic income is calculated in the accrual accounting system necessitates a similar but conceptually different assumption from the constant value of money assumption. Part of the calculating logic that separates the accrual accounting system from the early cash-flow accounting practice (i.e. total income accounting) is the incorporation of the accrual-basis or the periodic revenue and expense conceptions. The principle of matching expenses with revenues is deployed to allocate the cash flows into appropriate accounting periods. This allocation process is constrained by the actual cash flows, but the logic which dictates the artificial allocation is independent from the timing of cash flows. In other words, the allocation is executed following the accounting logic of matching expenses with revenues which is sometimes referred to as the accrual process.

For the accounting logic of periodic allocation to be consistent, we need to assume that the time value of money is negligible. By the time value of money, we mean the expression of changes in the value of money in different time periods measured by the present monetary scale. If we do not assume that the time value of money is non-negligible, we must adjust the values of the allocated revenues and expenses in different accounting periods somehow. Applicability of discount methods is wide open to argument, even the discount rate to be used is not obvious. Conventional accrual accounting circumvent the enigma of valuation problems by incorporating interest free expectations (Amey & Egginton, 1973, p. 108).
Since the allocation process is practically a transfer of a certain notional value expressed in monetary terms in one period to another, it can be abstracted to transactions that do not involve any external cash flow. Allocation process consists of internal transactions that are expressible only in terms of money and time. Value of money in the allocation process is determined in relation to the value of money in other time periods. The purchasing power of money in different time periods is not directly related to the allocation problem.

Thus, in order to differentiate this “constant time value of money” assumption from the constant value of money assumption, we call the constant time value of money assumption the “emptying-out of internal transaction time,” since this assumption decontextualizes the value of money in terms of time differences.

4. The double-enclosing of accounting space

Reintegrating once decontextualized time and space from the local context requires an abstract system that provides modes of time treatment of one form or another, as well as ways of situating events spatially (Giddens, 1991). Assumptions about money in the accrual accounting system show the way time is dealt with in it. In this section, the relationship between those assumptions and space in accounting is discussed in order to show that it is the valuation problem in an uncertain world to which the internal logic of the accrual accounting system gives an answer.

4.1. Accounting as a gatekeeper: primary enclosing

The locus of the accounting system is not necessarily confined to that of organizations, but it is convenient for our argument to take advantage of the general framework proposed by R.H. Coase. The framework is characterized by the dichotomy of markets and hierarchies as different coordinating mechanisms (Coase, 1937, 1990), which is confirmed in this statement: “islands of conscious power in this ocean of unconscious cooperation are like lumps of butter coagulating in a pail of butter-milk” (Robertson, 1930, cited also in Coase, 1937).

Coase and his followers, transaction cost economists, argue that the fate of organizations is determined by the relative costs of coordinating transactions in two mechanisms. In the framework of transaction cost economics, the accounting cost might be reflected in the concept of transaction costs since it includes all the incremental costs that are needed for organizing activities without the price mechanism (Coase, 1990).

However, one of the parallel conditions for an organization to coordinate economic activities is to recognize itself as an independent economic entity. It is here that accounting plays a vital role. Accounting serves to construct the self-image of the organization that has a distinctive territory of its own. The status of an organization as an independent economic entity is an artificially created image that is contestable if we take different views from those of transaction cost economics. For instance, those who view the economy as a nexus of contracts cannot take the ontological existence of a firm as taken for granted. However, as long as the current accounting system maintains its legitimacy, organizations are likely to keep their status as elementary units in the business world.

A basic function of the accounting system in this framework is that of the gatekeeper of organizations. All the records of external transactions are systematically collected even by a primitive accounting system. Those external transaction records are equivalent to gate records for the organization, entry and exit records of items of the general framework proposed by R.H. Coase. The framework is characterized by the dichotomy of markets and hierarchies as different coordinating mechanisms (Coase, 1937, 1990), which is confirmed in this statement: “islands of conscious power in this ocean of unconscious cooperation are like lumps of butter coagulating in a pail of butter-milk” (Robertson, 1930, cited also in Coase, 1937).

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confirm the boundary of the organization marked in financial terms. Accordingly, we can observe that the financial boundary of the organization is maintained by the accounting system. In this sense, the accounting system constructs islands of conscious power in the ocean of unconsciousness. This basic constructive role of the accounting system for organizations is what we call “the primary enclosing.”

4.2. Demarcated accounting space: secondary enclosing

The secondary enclosing demarcates (de-marcakes) accounting space for periodic income calculation. While the primary enclosing constructs the financial boundary of organizations, it is still dominated by the logic of the market when we look at the valuation process of business activities within organizations. Valuation is here defined in relation to expectation (Shackle, 1972): taking a certain set of expectations in order for the actor to position him or herself in an uncertain world. Since we are not talking about valuation as a psychological process of an individual human being but valuation in markets or organizations where a number of individuals with heterogeneous expectations interact, we approach the issue in relation to expectations in the valuation processes of the two different coordination systems.

In the market system, expectations of each participant might vary, but a unique valuation of a certain commodity is obtained as a price at a time. If all the market participants held the same future expectations, we would be in a situation where no market clearing price was obtained. If all participants expect that the price will move in one direction, either up or down, there will be no one who wants to sell or buy. Heterogeneity of expectations in the market is a necessary condition for the well-functioning of the price mechanism.

The price mechanism (ideally) produces a unique value for the item concerned as a system’s outcome, i.e. one price for a good or service at a given time and space as a consequence of unconscious cooperation between heterogeneous individuals. In this sense, diversity of expectations is transformed into a single universal value by the price mechanism. The current market price is the dominant value in the market at any one time.

In the accrual accounting system, the issue of valuation also involves future expectations in a different manner. For instance, valuation of fixed assets is subject to the depreciation procedure of “eine Aufwandrechnung a priori” (an a priori expense calculation) (Schmalenbach, 1926, S. 130). Expectations are systematically internalized in the accounting process in the first place.

Valuation is an integral and inseparable part of the accounting process, even though it takes a form of allocation on the surface of the accrual accounting system. The valuation process is intertwined with the way in which time and space is constructed in the accounting system. In order for the hierarchical organization to coordinate the diverse expectations of related parties, relatively independent of the rules of the market, both the timing of valuation and the subject of valuation must be endogenized in the accounting system.

The accounting system that was employed by the early venture businesses is subordinated to the market as far as valuation is concerned. Though valuation is a central theme of accounting, the early venture businesses had no valuation principle of their own, but depended upon the market valuation at this stage. Early going concern entities in England and Scotland did not have an accounting system that was equipped with the internal logic to perform valuation. Richard Hayes stated “(i)f only part of the goods be sold... [one should value] those goods that remain by you unsold at the price they cost you, or at the market price. N.B. It is usual with merchants, when they make a general balance of their books, to value the goods they have by them at the market price they then go at, at the time of their balancing, but some do not so” (Hayes, 1741, p. 79). Robert Hamilton also argued that “(i)t is much more proper to value the goods on hand in conformity to the current prices [at the time; such a value as the owner would be willing at present to buy for], than at prime cost” (1788, p. 285). In sum, periodic income that was generated in the usual English and Scottish merchants’ way were subject to market price fluctuations. In other words, market valuation dominated accounting valuation.
The accrual accounting system has obtained a distinctive valuation process with its own logic that is relatively independent from the market process. The valuation process in the accrual accounting system can be summarized as follows.

The accounting system is divided into two subsystems: the external transaction and the internal transaction accounting systems.

In the external accounting system, goods or services that are transacted in the external market are recognized as receipts or expenditures measured by the amount of accompanied cash flows. Those receipts or expenditures are not bound by any accounting period as far as they are in the domain of the external transaction accounting system.

In the internal transaction space, revenues and expenses that are successively translated from those receipts and expenditures are allocated to particular accounting periods. This allocation process is not dependent upon the external transaction timing since the assumption of indistinguishing external transaction time is held, but it is carried out in a way that it represents the fiction of the accrual process. An outcome of the allocation is the creation of an internal transaction accounting space insulated from the external market. We call this whole process of creating internal transaction accounting space “the secondary enclosing.”

The “emptying-out of internal transaction time” assumption that we discussed before has its place in the internal transaction accounting system. The fiction of accrual process where income is orderly generated actually proceeds within the internal transaction accounting space created by “the secondary enclosing.” This internal transaction accounting space is permeated with the artificially homogenized time value of money.

As DR Scott has argued, the transition from the market to organizational accounting is facilitated by the development of an integrated accounting system, which is qualitatively different from the preceding accounting systems. “Absorption of both (external and internal transaction accounting sub-systems) into a single more comprehensive system which is essentially different from the old double entry record” has come about to satisfy the needs of a larger going concern (Scott, 1931, p. 213). Accounting valuation in the form of accrual process internalizes expectations a priori, which simultaneously results in periodic income. As long as periodic income is a de facto reality within and without organizations, diverse nature of events is abstracted to a set of simple representative figures. This is how valuation in accounting helps the organization to position itself in an uncertain world.

In the accrual accounting system, valuation of items is the outcome of the intrinsic accounting logic, namely the accrual process, which incorporates a priori expectations systematically, even though they are based upon the market valuations of the past. Flow of time in the market place can be expressed in terms of the time value of money. In the core space of the accrual accounting system, internal transaction is void of the time value of money. In this way, the dictatorship of “money” as a carrier of time is withheld in the “accrual process.”

5. Smoothed income out of cash-flow chaos

The accrual accounting system generates a certain series of periodic income by positioning what are accounted for in each period. Those assumptions about time contribute to the accrual accounting system’s immunity against the whims of the market in terms of time value, consequently providing a part of the basis for the deterministic treatment of accounting.

The accrual process incorporates expectations to the future in idiosyncratic manner. Any valuation is future dependent, and the future is so uncertain that we cannot adequately describe it even stochastically. However “point estimates” of future events in accounting valuation systematically exclude uncertainties from the accrual process. In this sense the accrual accounting system deals with uncertain phenomena in a deterministic manner (Robert Roy cited in Mautz, 1967, p. 67). The accrual accounting system deals only with the future which has already taken place in the system.

The deterministic nature of accounting for uncertain phenomenon does not mean that the accounting process is simplistic. The accounting process is best characterized by its complexity.
5.1. Noise-induced order

Chaos theory, sometimes more generally referred to as complexity theory, has become widely acknowledged as providing an alternative perspective to Newtonian reductionism (Prigogine & Stengers, 1984). The analogue of the Newtonian world is a machine whose operations can be reduced to the functions of its component parts. The component parts are the cause, while the behavior of the machine is the effect.

Chaos theory has demonstrated that the extent to which the interactions of elements affect the behavior of the whole system is determined by the structural properties as well as the potential of the whole system in a given situation. In certain circumstances that a path happened to be taken at the micro level on a "bifurcation point" results in a novel order at the macro level of a complex nonlinear system. Such a circumstance is typically observed when the system is operating far from the equilibrium. In other words, the micro level noise is sometimes amplified in the system to the extent that it qualitatively alters the behavior of the whole system when chaos apparently dominates at elementary level interactions. In contrast, the same noise at the elementary level might not affect the system level order at all when the same system is operating near equilibrium.

The accounting research that is based on neoclassical economics has exclusively considered the latter situation, i.e. when one can assume that the equilibrium is the normal (ideal) state of affairs. In the former situation, i.e. when the system is operating far away from the equilibrium, noises at the elementary level sometimes induce order at the systems level. Tsuda has named this kind of order as "noise-induced order" (Kaneko & Tsuda, 1996), and the process within which such systems level order appears out of elementary level chaos is termed generally a self-organizing process. The following argument is a tentative study to interpret the accrual accounting system using the concept of "noise-induced order."

5.2. Accounting order out of chaos

Most accounting researchers agree that accounting processes are complex phenomena (e.g. Jain, 1973, p. 95; Chambers, 1966, pp. 454–455). This accounting process, however, often produces a stable pattern of a series of periodic income figures at the systems level. Most notably accounting income figures are contrasted with volatile market prices by their smoothness. Prices in a typical market such as a stock market, that is often termed an "organized market" and is regarded as an archetype of the market, fluctuate extensively, whereas accounting income figures show a less volatile outcome. The accounting craft that contributes to this property of accounting numbers is usually termed "income smoothing," recently discussed as a type of "earnings management."

The accrual process is noisy in the sense that it involves accounting operations based on subjective judgment. These subjective judgements are often criticized as it biases accounting numbers in favor of one party. However, it is also widely acknowledged that the universal outcome of the noisy process is orderly income series. The noisy accrual process is organized toward systems level income smoothing.

10 Chaos theory is closer to the social construction perspectives than the neoclassical economics in another crucial aspect. Prigogine and Stengers (1984) emphasize that the unit of analysis in their theory is artificially constructed (Prigogine & Stengers, Chapter 7), while the ontological existence of the analytical unit is presumed in the Newtonian world-view. Neoclassical economics assumes that rational choices are made by individuals with independent preferences. For the generally accepted assumptions of the rational choice theorists, see Green and Shapiro (1994, Chapter 2).

11 System which have a chaotic dynamic develops through a pattern of bifurcations. At the bifurcation point very small differences in parameter values determine which path the system follow.

12 The terms "micro" and "macro" in this paper are used differently from the traditional usage in accounting discourse. Traditionally micro accounting has been a synonym of business entity accounting and "macro accounting" has meant "social accounting" and "national accounting." In this paper, "micro level" refers to the level of interaction of elements, while "macro level" signifies the level of the behavior of the whole system. We substitute "micro" with "elementary" and "macro" with "system" whenever appropriate to avoid readers' confusion.

13 Accounting operation based on subjective judgement includes both discretionary and routine accounting manipulations.
Smoothed income series are not solely a product of managerial intentions. They partly reflect managerial maneuvers but are also the product of the accrual accounting system which has built-in mechanisms, such as depreciation procedures, that tend to reduce volatility in income series automatically. The foundation of the built-in mechanisms in the accounting system is again the accrual concept, since it theorizes the manner in which the principle of matching expenses with revenues is deployed to allocate cash flows into appropriate accounting periods. The accrual process smooths fluctuations in periodic income figures as matching process cancel the volatility out.

We argue that the accrual accounting system has evolved through a self-organizing process in accounting evolution. During this self-organizing process, managerial discretion has demonstrated its creativity, i.e. it produced noises, and some of those noises have entailed phase transitions at the systems level order. Creative accounting practices in the 19th century resulted in the accrual accounting system in which cash flow chaos is transformed into smoothed income order.

This evolutionary process can be traced in what we have described in previous sections, where noises have been transformed into institutionalized rules that have self-reproducing properties. The accrual accounting system can be interpreted as a complex system in which a noise-induced order of smoothed income series is generated.

6. Concluding remarks

The accrual concept has evolved to be a core of the intrinsic internal logic of periodic income accounting. Periodic income is a part of a socially constructed reality that has a self-reproducing capability once it is instituted. The technology and rationale of periodic income calculation is largely specified by the accrual concept which is incorporated in the accrual accounting system. By investigating time and space in the evolution of the accrual accounting system, we have contended that the accrual accounting system should be interpreted as a historically evolved social institution. At the same time, the accrual accounting system could be interpreted as a complex system within which noise-induced order evolves at the systems level. In the noisy but highly structured accrual process, smoothed income series are generated in orderly fashion. The construction of time and space in the accrual accounting system is necessary for the accrual concept to have its place firmly established in the system.

One of the consequences of the incorporation of the accrual process is that there is no important difference between the forward and backward directions of time within the core space constructed by the secondary enclosing in the double enclosing accounting system. This emptying-out of internal transaction time facilitates the institutional rigidity of the accrual accounting system which provides an alternative way to construct values not within but without the price mechanism.

An implication of interpreting the evolution of the accrual accounting system in this manner is that the underlying legitimacy of periodic income lies in the fiction of the accrual process. Recent movements to report comprehensive income may apparently seem to undermine the foundation of the accrual process. Indeed, fair value accounting for financial instruments, which may allow the market value to trespass on the internal transaction accounting space, is a major underlying force for the introduction of comprehensive income reporting in some countries.

However, the institutionalization of the comprehensive income reporting is more likely to enhance the legitimacy of conventional earned income, if comprehensive income is divided into the earned income and other comprehensive income. Institutionalization of comprehensive income reporting would mean that the accounting system becomes a more multi-layered system within which unrealized marketable gains and losses obtain their provisional accounting display before recycling process while the accrual process as the essential part is hold firmly in its heartland.

References


