

LINKAGES BETWEEN MACRO AND MICRO BUSINESS ACCOUNTS: IMPLICATIONS FOR ECONOMIC MEASUREMENT

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The paper shows the relationship between microbusiness accounting based on double-entry bookkeeping and macroeconomic accounting based on quadruple-entry bookkeeping. In order for microaccounts to successfully aggregate into macroaccounts (i.e. preserve macro/micro linkages), quadruple-entry bookkeeping requires that the traditional double entries, recorded by transacting microbusiness units, be "consistent" with each other. In fact national economic accounting implicitly assumes that such consistency is maintained when national "aggregates" are uniquely extracted from national accounts and when national "identities" are claimed to hold true.

The main purpose of the paper is to show important examples where quadruple-entry consistency is not satisfied. These examples typically involve "complex" economic transactions between business units in which the legal form of the transactions do not necessarily represent their economic substance. When this occurs, different business units have genuinely divergent conceptions and perceptions with respect to their mutual economic transactions. Therefore, microbusiness accounts cannot be successfully aggregated into macroeconomic accounts without violating the integrity of microdecision making records.

The conclusion of the paper introduces a new theory called Perpetual Imbalanced Accounting. The theory shows that inconsistent (or imbalanced) economic accounting does tend to become consistent (or balanced) over sufficiently long time periods. Therefore, we must adopt a more dynamic view of national accounting if we desire to preserve successful macro/micro linkages. However, the problems of imbalanced macroaccounting and its statistical consequences cannot be entirely avoided no matter how long the accounting time period is taken. All of the above have important implications for the revision of the United Nations System of National Accounts.

I. INTRODUCTION

One purpose of this paper is to clarify and extend an earlier paper by the present writer (Postner (1986)) on a closely related subject. The relevant highlights of that paper are summarized in the following section. Another purpose is to place the topic and problems of "macro/micro linkages" in the context of the related literature on the subject, for the business sector. Later, special emphasis is given to the relation between this writer's views on macro/micro linkages and those developed in the French system of intermediate accounts as seen in Vanoli (1986).

The main focus of attention is, however, on illustrating the kinds of economic measurement problems that arise when a national accountant attempts to trace the microfoundations of macroeconomic accounts for the business enterprise sector. It is shown, in section III, that the United Nations System of National

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Accounts should be amended, particularly with respect to the chapters on transaction concepts and classifications [United Nations (1968, Chapters VI and VII)]. More precisely, the United Nations SNA should be amended *if* a future version of the System is meant to provide for macro/micro economic linkages. The System, at the present time, does not account for “complex” economic transactions between individual decision-making units within the business sector. At the same time the general treatment of service transactions seems out-of-touch with economic reality. We question whether the SNA helps us “get to know” the peculiarities of economic substance that characterize the different businesses of a nation’s enterprise sector. In developing our arguments in these directions, this paper has benefited from a detailed examination of documents supplied by the U.S. Financial Accounting Standards Board [FASB (1985a and 1985b)].

The concluding section V takes a more optimistic view of the questions of macro/micro linkages. This view is inspired by a new theory called Perpetual Imbalanced Accounting. The theory is compared in a modest way with the theory of General Economic Equilibrium. The new theory is merely sketched since much more work remains to be done, but on the basis of initial impressions it does appear that we can have “our cake” (a viable macroeconomic accounting scheme) and “eat it too” (with reasonably consistent macro/micro linkages). The trick appears to be the need to take a more dynamic view of our subject matter.

II. REVIEW OF LITERATURE

This section first highlights an earlier paper by the present writer. The main themes of that paper are then related to the economic literature insofar as the literature recognizes similar, but not identical, problems and concerns. This helps put the topic of macro/micro linkages in proper perspective. It will be seen that the topic, when considered in more general terms, has a long history. Some very important aspects of macro/micro linkages are directly faced in the French system of intermediate accounts. These aspects are so important that they deserve special treatment in a later section after the substantive illustrations worked out in section III. Intermediate accounts, therefore, are not reviewed in the present section. Readers who are already well acquainted with the literature may omit this section and go directly to the next one.

An earlier paper (Postner (1986)) set up a national accounting framework which helps identify the measurement problems that arise when the macroeconomic accounts of a nation’s enterprise sector are put on a microdata foundation.¹ The foundation consists of sets of microbusiness accounts, after appropriate rearrangements and reclassifications. The overall accounting framework is restricted to market transaction statements in order to focus on the essentials of the problems. Each statement has dimensions equal to the number of sectors and the number of transaction categories distinguished for a national economy. This framework, though, does implicitly cover both current and capital accounts or, alternatively, both nonfinancial and financial accounts. In Postner (1986) the credit side and debit side of a nation’s market transaction statement are shown apart, though their simple mathematical properties are identical to

¹The terms “enterprise” and “business” are used synonymously, subject to later specifications.

that of a combined market transaction statement shown in Sigel (1962, Table 1, p. 28). The key questions posed in this context are: can the macroenterprise sector accounts be regarded as a consolidation of observed microbusiness accounts? And if not, what are the sequences for economic measurement?

In the earlier paper it is shown that the answer to the first question is negative. Macroenterprise accounts are subject to a series of statistical adjustments and data selections in order to guarantee the sectoral balance requirements and transaction balance requirements of a national accounting system. The balance requirements essentially follow from an implied quadruple-entry bookkeeping system. Microbusiness accounts, on the other hand, cannot be so adjusted and selected without losing their original characteristic of preserving decision-making records of economic performance. But, suppose we do go ahead and replace the macroenterprise sector by an aggregation and attempted consolidation of original microbusiness accounts. What are the statistical consequences? Again one can show that sectoral balance requirements are generally unaffected. However the national market economy, as measured, would no longer be in balance in terms of transaction categories. For at least some transaction flow categories, the summation of all credit entries, with summation across sectors and microbusiness units, would not equal the summation of category-matched entries on the debit side. In Postner (1986), the latter phenomenon is referred to as the "limits of statistical consistency" and the statistical inconsistency involved has certain properties with economic meaning. A somewhat similar phenomenon can also be found in the economic accounting literature in discussions concerning "discrepant articulation" and also in discussions of "prospective accounts." Let us therefore briefly examine this literature.

An important paper by Stone, Utting and Durbin (1950) on sampling methods in national income statistics considered *inter alia* the question of alternative sources of data for common transaction entries. When estimates provided by two transactors differ with respect to a mutual transaction, the accounting system is subject to misarticulation. The two alternative estimates must be reconciled. It should be noted, however, that Stone *et al.* were primarily concerned with macroeconomic sectoral accounts and the need for preserving certain national accounting identities. Morris Copeland's (1952) sources and uses of funds accounting contains an examination of the consequences of deviations from accounting uniformity by mutual transactors. The deviations are due partly to inadequate data and partly to conflicting accounting conventions for different sectors. Copeland identifies three main types of discrepancies: (1) differences in timing of transaction entries, (2) differences in account classification, and (3) differences in valuation of claims and obligations. There is one sentence in Copeland that deserves quotation (p. 165):

"In part also they (accounting deviations) are due to the fact that the two parties to a transaction may look at it somewhat differently."

This latter point, however, is not developed since Copeland is ultimately not concerned with macro/micro linkages.²

²Richard and Nancy Ruggles (1987) have correctly indicated the close connection between Postner's (1986) market transaction accounts and Copeland's (1952) flow-of-funds accounting system. The two approaches though, while similar, are developed for dissimilar purposes.

Attention should also be directed to the intelligent comments of Schelling (1958) on the U.S. national accounting system. He explicitly stated that national accounting should theoretically be regarded as one of “quadruple entry.” But for practical purposes, quadruple entry cannot be achieved unless all parties to common transactions view their transactions in a mutually consistent manner. Schelling also mentions the pitfalls for economic policy of “forcing” consistency when none exists. So a good national accounting system should “keep track of its inconsistencies” [Schelling (1958, p. 329)], rather than arbitrarily eliminate them. These are all important observations and are closely related to questions that arise within the topic of macro/micro linkages. But, as we shall soon see, Schelling’s observations on preserving discrepancies have had very little influence on international standards for national accounting.

It is well known that the United Nations SNA (1968) is based on, what can be called, the matrix approach to national accounting. This approach can be traced back to Stone (1949) where it is shown that the simple matrix representation is essentially equivalent to other representations of accounting systems. This basic idea is extended in SNA (1968) to encompass a complete accounting of a national economy. In fact, the matrix approach results in an *integration* of all special accounting schemes. So the matrix approach became adopted as the international standard for national accounting, but not without some telling criticism. For example in a Report of a Conference on Proposals for Revision of the United Nations SNA, as seen in Tice (1967), we find (p. 64):

“Throughout much of the discussion of definitional matters it was pointed out . . . no room provided for alternatives. There was also present the suspicion that this was the case . . . because each entry is an element in the matrix; both parties are then forced, by accounting convention, to view the transaction alike, whether or not this has relevance to the real world or to the analytical usefulness of the accounts.”

This means that the representational convenience provided by the matrix approach comes at the cost of neglecting the kind of discrepant articulation and inherent inconsistencies previously identified by Copeland and Schelling. The matrix approach has another disadvantage as well [Tice (1967, p. 80)]:

“The distinction between internal one-party entries and two-party transactions is . . . easier to keep track of and communicate in a system of accounts than in the master matrix format of the Report.”

This particular distinction plays a key role in identifying the essential features of the macro/micro linkage problem as seen in Postner (1986). One may, however, take the view that all this is irrelevant since SNA (1968) is not concerned with macro/micro linkages (say, for the business sector). But even within the scope of SNA, the matrix approach, by eliminating alternatives and discrepancies, abstracts from the opportunities opened up by having a complete accounting system. Again from Tice (1967, p. 91):

“... when one sets up an integrated system—with both financial and non-financial entries and with a focus on full sector accounts—the discrepancy problems and the value of showing discrepancies become greater, not less, than in an income and product system focusing on

national consolidated accounts . . . the formal procedural elimination of all discrepancies will result in worse analysis and in poorer insight into the economy . . . the presence of the discrepancies is in fact an important statistical and analytic control.”³

So far our review of the literature has been restricted to what can be called retrospective (or, *ex post*) national accounting. In the ideal situation each market transaction entry in the national accounts scheme has an exact correspondent somewhere else in the same scheme; each transaction category involves a payable (debit entry) for one sector and an equal receivable (credit entry) for another sector. The accounting system is then perfectly articulated. In a less-than-ideal situation, as described by writers such as Copeland and Schelling (and Sigel), discrepant articulation can certainly arise for various reasons (further discussed in the next section). But such discrepancies, staying within an essentially macro-accounting framework, are still regarded as the exception rather than the rule. The general idea is that with better statistical data and more careful searching out of definitional and conceptual ambiguities, the discrepancies can eventually be removed. There may, however, be a case for retaining some elements of discrepant articulation as supplementary to fully-adjusted accounts.

On the other hand, the earlier paper (Postner (1986)) identified the possibility of pervasive discrepant articulation when macroeconomic accounts are put on microaccounting foundation. This possibility can also be found within the realm of, what is called, prospective (or, *ex ante*) national accounting. In this case sectoral accounts are drawn up, not on the basis of observations concerning some past historical period, but on the basis of sectoral plans for some future period. The relationship between prospective and retrospective accounting values was shown many years ago by Lindahl (1939). The applications of prospective accounting to Swedish National Budgeting can be found in Ohlsson (1952, Chapter VIII). In a system where prospective accounts are drawn up “independently” for each major economic sector of a national economy, the traditional national aggregates such as gross domestic product may no longer be extracted so as to yield unique totals.⁴ Moreover, the traditional national identities, such as total saving equal total investment, are no longer satisfied (*ex ante*). This lesson from the review of the literature is important for the following reason. When macroaccounts are put on microfoundation, the distinction between retrospective and prospective accounting, as we all see, often becomes blurred.

There is one further point that might be made before turning to more substantive issues. Examples of discrepant articulation can readily be found in the accounting literature with regard to questions involving revaluation accounts and the corresponding valuation of national and sectoral balance sheets. It is now well recognized that there is no reason for both the debtor and creditor, with regard to an existing financial instrument, to record an identical valuation change for their respective obligation and claim over a given time period. Such revaluations do not involve a two-party market transaction. They are, in effect,

³This quotation and the previous one are attributed to Stanley Sigel, then associated with the U.S. Federal Reserve Board. Comments attributed to Gary Fromm, in Tice (1967, p. 89), are also relevant.

⁴For convenience we assume a closed economy.

a pair of internal one-party entries that may differ depending on the viewpoint of each party. The scope of this paper and the earlier one are, however, limited to a discussion of market transactions strictly defined. Our notion of market transactions is spelled out in Postner (1986, pp. 223–226) and is very similar to the same notion described in Lützel (1986, pp. 202–203). However, the misarticulation that does arise as a result of (internal) revaluation entries provides useful background material for somewhat related phenomena more closely identified with macro/micro linkages.

III. IMPLICATIONS FOR ECONOMIC MEASUREMENT

III.1. *Preliminary Remarks*

We know that microbusiness accounting data can be rearranged and reclassified to suit the needs of national accounting concepts and definitions. An approach to this subject is outlined in Young and Tice (1985) and a much more detailed treatment of one aspect of the subject can be found in U.S. Department of Commerce (1985). Microaccounting data usually consist of business financial reports or taxation reports and the two sets of reports can differ in significant ways. The conceptual differences, though, are typically known and can be taken into account by the rearrangement and reclassification procedures. These procedures *per se* do not violate the integrity of microbusiness records. On the other hand, microbusiness records *are* implicitly violated when their aggregation (to the macroenterprise sectoral level) is statistically adjusted and subjected to various data selections in order to “conform” to the other macrosectoral accounts of the national economy. A precise outline of such violations, and related considerations, can be found in Postner (1986, pp. 227–230).

In the present paper we are concerned almost exclusively with the macroenterprise sector *per se*—*prior* to any adjustments and selections mentioned above. We are concerned with whether or not it is possible to construct well-defined macroenterprise sector accounts that can be systematically linked to their microbusiness accounting foundations. But in order to examine the issue, we must first state the “rules of the game.” It is permitted to rearrange and reclassify microbusiness accounts in the usual way, without violating their integrity to reveal decision-making records of performance. Our examination is mainly limited to market transactions within the national economy’s enterprise sector. We assume that each microbusiness unit possesses a market transaction statement perfectly comparable with the transaction statements of all other microbusiness units. The uniformity of transaction statements is a result of rearrangement and reclassification procedures. The restriction to inter-unit market transactions permits us to abstract from intra-unit (non-market) transaction records that need not be comparable. At the same time, we need not take into account the various imputed and attributed transactions imposed by the national economic accountant. The advantages of this strategy are further spelled out in Postner (1986, pp. 223–226).

In the light of the preceding “rules of the game,” it will now be easy to see under what conditions a “well-defined” macroenterprise sector can be constructed

from microbusiness accounting foundations. As we shall see, by the examples in the following subsections, the required conditions imply that “consistent” quadruple-entry bookkeeping is satisfied. In these conditions we may claim that a nation’s business sector accounts are systematically characterized by macro/micro linkages. These conditions, however, are not generally satisfied and we shall, therefore, attempt to categorize the cases where “consistent” quadruple-entry bookkeeping breaks down. All this has implications for economic measurement that lie beyond the confines of our present treatment. In the course of the following subsections, we shall be particularly concerned with spelling out the implications for the United Nations SNA (1968) chapters on transaction concepts and related topics.⁵ The development illustrates the need for working more closely with business accounting standards boards. In particular, a large part of our development stems from the deliberations of the U.S. Financial Accounting Standards Board (FASB), recently summarized in Solomons (1986).

III.2. *What Is Meant by “Macro/Micro Linkages?”*

Before turning to specific examples of inter-unit business accounting, it seems important to clarify what is meant (or, what we mean) by “macro/micro linkages” for the business enterprise sector. Indeed, the “linkage” concept may have more than one meaning. We shall distinguish between a “weak form” of macro/micro linkages and a “strong form” of macro/micro linkages. (This subsection can be omitted without loss of continuity.)

The best way to approach the subject is to initially consider the case of a group of closely-affiliated companies. In this case there are well-known accounting procedures for yielding a consolidated financial statement for the group taken as a whole. The procedures require that each of the companies in the group have uniformly comparable accounting statements and that all intra-group (inter-company) transactions be accounted for in a mutually consistent manner. So the consolidated statement for the group would only reflect transactions for the group of companies with transactors outside the group. This idea can easily be extended to the macroenterprise sector, considered as a group of microbusiness accounting units. We have already assumed that all business units possess uniformly comparable (market transaction) accounting statements. If, in addition, all intra-sector (inter-unit) transactions are accounted for in a mutually consistent manner, then it is possible to yield a fully consolidated accounting statement for the enterprise sector as a whole. The consolidated statement would only reflect market transactions for the enterprise sector with all other sectors of a national economy.

In practice, the national accountant is usually not interested in such a fully consolidated statement. For example, in order to extract a national aggregate such as gross domestic product, consolidation is needed only with respect to transaction categories underlying current production accounts (call this, partial consolidation). However, such special needs are not our main concern. We say that if the microbusiness unit accounts satisfy the requirements of full macroconsolidation, as stated above, then the accounting system is characterized

⁵It should be noted that the most recent United Nations national accounting publication (1986) does not cover conceptual and definitional issues.

by a “weak form” of macro/micro linkages. The reason for using the term “weak form” can now be stated. The *criterion*—that all intra-sector (inter-unit) transactions be accounted for in a mutually consistent manner—is actually a sufficient condition for the sectoral consolidation operation. However, the criterion is not a necessary condition because the consolidation operation may still be possible (or nearly possible) when the criterion is not strictly satisfied. This will be apparent in examples to follow.

Given a consolidated accounting statement for the macroenterprise sector, it is not generally possible to recover the accounts of the constituent microbusiness units, say by deconsolidation. Suppose, however, we are given the accounts of the macroenterprise sector in a form which represents a combination (rather than consolidation) of microaccounts. Moreover, suppose the combined enterprise sectoral accounts distinguish between intra-sectoral transactions and all other transactions (i.e. transactions with other sectors of the national economy) and that this distinction is drawn for all transaction categories that are pertinent.⁶ We assume that the debit and credit entries for all intra-sectoral transactions are equal for each and every pertinent transaction category. This is, of course, equivalent to assuming the requirements of consolidation, although such consolidation is not performed. (The “weak form” of macro/micro linkages is, therefore, implicitly guaranteed.) Now suppose there exists a method of recovering the constituent microbusiness accounts (say, by some allocation procedure) from the combined sectoral accounts and that this method maintains the distinction between intra-sectoral and all other transactions for each and every business unit. Under these conditions we say that the accounting system is characterized by a “strong form” of macro/micro linkages. The “strong form” of macro/micro linkages then includes the “weak form” as already indicated.

III.3. *Economic Substance Versus Legal Form*

The preceding subsections provide the rationale for a series of examples given in this and the next subsection. First it should be clear that consistent quadruple-entry bookkeeping guarantees the “weak form” of macro/micro linkages for the business enterprise sector. This follows directly from the nature and properties of market transaction statements [see Sigel (1962, pp. 26-29)]. Second it should also be clear that we are concerned with conditions where consistent quadruple-entry accounting breaks down. This would mean that inter-microunit transactions are not accounted for in a mutually consistent manner (see the following examples). Our interest in such potential inconsistencies is limited to cases where the two (or more) parties to a transaction have *genuinely* different views or knowledge with respect to their mutual transaction.⁷ We are not primarily interested in describing the breakdown of consistent quadruple entries due to differences in timing, or differences in classification, or even to recording errors of transaction entries since such differences can usually be

⁶The pertinent market transactions in an economy-wide sector/transaction category accounting system are illustrated in Sigel (1962, Table 1, p. 28).

⁷This is reminiscent of the concerns of Schelling (1958) described earlier, although Schelling is mainly interested in inter-sectoral accounting.

overcome by various rearrangement, reclassification, or even by correction procedures [see U.S. Department of Commerce (1985)]. On the other hand, genuine differences in transactors' views or knowledge cannot be so overcome without violating the integrity of their respective microaccounting records. Finally it should be noted that the national economic accountant is in an entirely different position compared to the business corporate accountant. The latter, when preparing consolidated accounts for a group of closely-affiliated companies, is in an authoritative and full-information position to mediate and reconcile the individual accounts of the constituent companies—all of whom together have a common focus with respect to their economic interests. The national accountant, on the other hand, works with limited authority and limited information and yet is responsible for literally thousands (perhaps, even millions) of microbusiness entities each with its own divergent economic interests. True, the national accountant can try to impose rules of "good accounting behaviour," but as we shall see these rules can only go so far.

A typical example of quadruple entry for a simple sale/purchase transaction between two microbusiness units of the macroenterprise sector would be:

Unit No. 1		Unit No. 2	
account receivable (=x)	sale of producer goods (=x)	purchase of producer goods (=y)	account payable (=y)

There are, then, two familiar *T*-accounts, one for each business unit. The left-hand side of each account represents a debit entry; the right-hand side denotes a credit entry. Since each business unit practices double-entry bookkeeping, the two sides of each *T*-account are equal. For consistent quadruple-entry bookkeeping we would need: $x = y$. For only in this case would the debit entry for each of the two implicit transaction categories equal the credit entry for its respective counterpart. Is it reasonable to suppose that $x = y$?

Before answering that question it should be known that we are not concerned here with differences in valuation practices between sales (producer prices) and purchases (purchaser prices). Any such differences can be made up by introducing a third transactor (say, the wholesaler). Similarly, the fact that the sale and purchase of producer goods is on open account rather than on a cash basis is not critical since a transaction on the latter basis can easily be accounted for by again introducing a third party (i.e. the banker with whom the two parties hold demand deposits).⁸ Our task is to keep the example simple while focusing on essentials. The usual non-market internal transaction entries that accompany a sale and a purchase are excluded since the analysis is confined to market transaction entries.

In the above conditions, it is the conventional wisdom of macroeconomic accounting that we should expect: $x = y$. This equality guarantees a well-defined system of macro/micro linkages for the business sector. The conventional wisdom seems to be a reasonably accurate approximation for the usual sale/purchase

⁸It is sometimes claimed that in economics it takes three to "Tango!"

transaction. Such an approximation is what the national accountant has in mind when macroaccounts for the business sector are drawn up. However, when we come to examine the microfoundations of macroaccounts, a closer examination of the supposed equality is warranted. In the following we will show a number of cases where the equality ($x = y$) cannot be supposed or approximated. It will be seen that a good deal depends upon whether one is concerned with the economic substance of market transactions or with their legal form. The United Nations SNA (1968, pp. 102, 135 and 235) supports the legal-form point of view. This is contrary to the position of business accounting standards, such as FASB, which are definitely oriented towards accounting for economic substance.⁹ The present writer supports the position of economic substance over legal form and recommends that SNA be amended in this respect. It is true, nevertheless, that the concept of economic substance is not always clear and is open to subjective elements. Legal form is more clear cut, but economically irrelevant.

In some industries, such as music recording and publishing, products are commonly sold by manufacturers with a “right of return.” The seller may also have significant obligations to perform for the purchaser after the legal sale. This situation is covered by FASB and specific rules are formulated to provide accounting guidance towards the economic substance of such transactions. Still, it is not surprising that the two transacting parties, when right of return exists, may end up with inconsistent quadruple entries in their accounting records for a particular time period. According to generally accepted accounting principles, which favour conservatism, we should initially expect: $x < y$ with FASB guidelines.¹⁰

A more interesting case concerns, what is known as, “product financing arrangements.” The seller (Unit No. 1) agrees to re-purchase the product from Unit No. 2 at a later date, either directly or indirectly through a third party. The re-purchased product is substantially the same as the product originally sold, though the re-purchase may involve some further processing on the part of Unit No. 2. Product financing arrangements, a favourite of the big energy resource and chemical firms, can become quite complex with various complementary features. Even with FASB guidelines it is easy for the two business units to initially record:

Unit No. 1		Unit No. 2	
demand deposits (=x)	sale of producer goods (=x)	nonbank loan (=y)	demand deposits (=y)

Here, we might expect: $x = y$, but consistent quadruple entry is not satisfied. This is a misclassification inconsistency that cannot be rectified by the usual re-classification procedures if the two business units maintain genuinely different views with respect to their mutual transaction. Such differences in view are more

⁹A good summary of the issues can be found in Jaenicke (1981).

¹⁰FASB is almost solely concerned with formulating rules for double-entry accounting (the seller and purchaser accounts are distinct) rather than for consistent quadruple-entry accounting (where the seller and purchaser accounts are coordinated).

likely when product financing arrangements become increasingly complex and when the duration of the arrangement becomes longer.¹¹ The essential economic substance of such arrangements is one of loan/financing a product (pending its future use) rather than the legal form of a product sales transaction. However, it is difficult to identify economic substance from conflicting accounting records in the many borderline cases of sales/financing schemes.

Another example concerns accounting for sales of real estate and land. The following quotation from Jaenicke (1981, pp. 34–35) is noteworthy:

“The economic substance of a real estate transaction may differ from its legal form. A transaction with the legal form of a real estate sale may in substance be a construction contract, a service contract, a lease, an agreement to lend or borrow, an agreement to establish a joint venture, an agreement to divide profits, a deposit on or an option to buy an asset, or a sale of something other than the apparent object of sale.”

So while consistent quadruple entry would require, say:

Unit No. 1		Unit No. 2	
commercial mortgage (=x)	sale of real estate and land (=x)	purchase of real estate and land (=y)	commercial mortgage (=y)

where we assume, for simplicity, that the real estate seller operates a captive mortgage finance company and $x = y$, the two units may deploy inconsistent accounting even with FASB guidelines. If Unit No. 1 regards the transaction as a present loan to finance a future construction contract on the property (say, a shopping centre) while Unit No. 2 maintains a prospective position we would observe:

Unit No. 1		Unit No. 2	
nonbank loan (=x)	commercial note payable (=x)	purchase of real estate and land (=y)	commercial mortgage (=y)

This situation is most probable when Unit No. 1 retains some of the economic risks and uncertainty normally associated with ownership of real estate and land, although Unit No. 2 might consider that the real estate has been sold and purchased. The situation is also likely when Unit No. 2 has not yet made a tangible investment in the property. It is easy to illustrate other accounting configurations of inconsistency, particularly in the presence of third parties and complex contractual commitments. In a sense, in the above case, Unit No. 1 has a retrospective view of the accounting transaction; Unit No. 2 has a prospective

¹¹At the termination of the agreement, the two units may simply reverse their initial debit and credit entries (a debit entry for a sale is equivalent to a debit entry for a purchase).

view.¹² Indeed such differences in view are often the ultimate rationale of observed economic transactions.

A notorious example of quadruple-entry inconsistency occurs with respect to long-term leasing arrangements, say for fixed capital goods. This case has been dealt with in great detail by FASB guidelines, but it is still perfectly possible for the lessor to regard the transaction as a capital lease while the lessee simultaneously accounts for the transaction as an operating lease.¹³ Once again, leasing transactions can become very complex with the presence of third parties and various financial leveraging scheme. In the simple case where the lessor operates a captive sales financing company we may find that in the initial time period:

Unit No. 1		Unit No. 2	
commerical loan (= x_1)	sale of fixed capital goods (= x)	rent paid (= y_1)	demand deposits (= y)
demand deposits (= x_2)		interest paid (= y_2)	

where: $x = x_1 + x_2$, $y = y_1 + y_2$, and $y = x_2$. Clearly Unit No. 1 is the lessor with a capital-lease viewpoint; Unit No. 2 is the lessee with an operating lease viewpoint. In this initial period: $x > y$. The sale amount shown on the credit side of the *T*-account of Unit No. 1 equals the discounted total of all expected future rent payments over the life of the lease by Unit No. 2.¹⁴ (Capital leases are also known as sales-type leases.) At a later time period we may then find:

Unit No. 1		Unit No. 2	
demand deposits (= x)	interest received (= x_1)	rent paid (= y_1)	demand deposits (= y)
	commercial loan (= x_2)	interest paid (= y_2)	

Now the commercial loan holding of Unit No. 1 is partly redeemed by a credit entry with the receipt of further rent payment from Unit No. 2 and we should expect: $x = y$. But a quadruple-entry discrepancy still persists. The type of situation depicted here is a special case of, what is known as, "off-balance-sheet financing" on the part of Unit No. 2, the lessee.¹⁵ (Rent payments, in this case, are a kind of installment purchase of the fixed capital goods involved in the transaction.)

Before presenting another set of examples of inconsistencies involving inter-unit accounting the following points should be noted. The various elements of: (1) project financing arrangements, (2) real estate transactions, and (3) long-term leasing (including lease-backing), may all be combined in complex multi-party

¹²See the review of literature on prospective accounting in section II of this paper.

¹³See OECD (1986, Chapter III) and Nancy Ruggles (1987, p. 46).

¹⁴This is essentially a prospective view of the transaction.

¹⁵An amusing introduction to off-balance-sheet financing, together with many other cases, can be found in Dieter and Wyatt (1980).

economic transactions. In fact it is the complexity *per se* of such economic affairs that often gives rise to the genuinely different perspectives of the individual participants. (Complexity also includes taxation rules, regulations and other institutional considerations that influence the different accounting views of the parties involved.) The subjectivity of economic complexity is naturally reflected in inconsistent accounting records. If national economic accountants insist only considering simple economic transactions, then there is not much room for accounting inconsistencies. Such phenomena become the exception rather than the rule. The exposure to more complex and sophisticated economic transactions can change the direction of national accounting.

Finally, in the examples of this subsection it is seen that various transaction flow categories are subject to imbalanced accounting. In our context this means that the debit side (or “outgoings”) of the transaction category are not equal to the counterpart credit side (or “incomings”) of the same transaction category for a given example. This is, of course, what we ultimately mean by inconsistent quadruple entries. But in the examples given so far there is one transaction category where balanced accounting is maintained, namely the category called “demand deposits.” Overlooking problems of bank float and pure recording errors, the examples of this subsection appear to support a conjecture originally made in Postner (1986, p. 229).

III.4. *Service Transactions and Debt Restructuring*

The examples of the preceding subsection are largely confined to transactions involving tangible goods. In these cases it is possible to adopt an accounting policy based on acquisition/surrender of legal title to such tangible goods. Indeed this is the policy suggested by United Nations SNA (1968, pp. 102 and 135). This policy has the advantage of concrete simplicity, but is often at variance with business accounting standard policies that stress economic substance: the transfer of economic risks and future benefits of ownership as opposed to legal form. We support the position of economic substance over legal form because micro-economic behaviour is more likely to reflect the economic substance of a transaction rather than its legal form. When, however, we come to consider service transactions, even the criterion of legal form is difficult to define. The United Nations SNA (1968, p. 95) states that:

“The production of services takes place at the time the services are rendered.”

and even that (p. 102):

“The purchase occurs at the time when legal title is acquired to the goods, or the services are rendered.”

Once again national economic accounting pronouncements are at variance with business accounting standards and do not appear to reflect the complexity of economic reality. We shall see that FASB has a long tradition of trying to put the terms “the time the services are rendered” into an operational accounting form. The issues often require very special knowledge; there are no short cuts. It is interesting to note that these issues of accounting for service transactions

are significantly different than those related to the concept and measurement of service output [as seen, e.g. in the work of Hill (1977)].¹⁶

In a sense accounting for service transactions is easier than accounting for tangible goods. Services are typically not subject to trade margins, so that “producer prices” should equal “purchaser prices.” At the same time, most services cannot be held in inventory although some costs of producing services may be deferred by the producer. In any event these simplifications do not materially affect the development of our arguments since the accounting analysis is confined to market transactions. This means that service transactions become more analogous to goods transactions. On the other hand, we are now faced with the additional problem of trying to operationally define what is meant by “the time the services are rendered.” This particular problem is discussed in the accounting standards literature under the title of accounting “recognition criteria.”

Our first example of a service transaction concerns the increasingly important area of franchise fees. This area is subject to strict FASB guidelines, at least with respect to the franchisor and with special attention to, what is called, initiation franchise fees. This is a typical service-type transaction where service fees (in this case, franchise fees) are often paid prior to the complete performance of the services rendered. The FASB lays down very conservative accounting rules for the franchisor as to when its manifold services are truly rendered. There are no such rules for the franchisee with the result that we may initially observe:

Unit No. 1		Unit No. 2	
demand deposits (= x)	prepaid franchise fees (= x)	franchise fees paid (= y)	demand deposits (= y)

Note that Unit No. 1, the franchisor, accounts for the fees received as a prepayment (deferred revenue) which is a liability. Unit No. 2, the franchisee, takes a more prospective view and regards the fees as a current expense. Such differences in view become more material when the franchising agreement and related initiation services are complex and when the accounting period concerned is relatively short (e.g. quarterly accounting). A similar situation arises with respect to the accounting recognition of warranty service arrangements and with respect to hookup revenue of cable television companies. Once more the issues require very special knowledge of the “services rendered.” Less similar, but also noteworthy, are problems of accounting for revenues of advertising agencies, primarily media commissions.

An entirely different example of a service transaction involves, what is called in business accounting circles, “front-end loading.” It was mentioned earlier that

¹⁶Our treatment of service transactions is largely limited to producer services since the discussion of the whole paper primarily concerns the business enterprise sector. The share of services in GDP is described in Blades (1987).

services are not subject to inventory accounting and, therefore, the cost of producing services are normally expensed, though some deferment is permitted. In a sense, business accounting and economic accounting for service production and sales are conceptually in agreement. (This agreement does not extend to the production and sales of tangible goods, because economic accountants overlook the distinction between the physical value of production and the sales value of production—namely marketing costs.) Because of the peculiar conditions under which services are produced and sold, there is a tendency for producers to claim recognition for services sales even before the costs of services are expensed and, therefore, before services are “rendered.”

The tendency exists, unless there are specific accounting standards to the contrary (such as in the case of franchise fees). We observe the following:

Unit No. 1		Unit No. 2	
demand deposits (=x)	mortgage service fees received (=x)	prepaid mortgage service fees (=y)	demand deposits (=y)

Here service fees are charged by a savings and loan association (Unit No. 1) for continuing to service mortgages no longer owned by the unit, although the services have not yet been provided. Unit No. 2 now owns the mortgage, and has prepaid (an intangible asset) all future service fees to Unit No. 1. So the total future fee is anticipated when the mortgage changed hands. Unit No. 1 takes a prospective view and is practicing “front-end loading” to the detriment of consistent quadruple entries. A somewhat similar situation occurs when real estate developers prepay special service fees to savings and loan associations for what are poorly secured loans. The banking unit takes an optimistically prospective view that the real estate project will be a success. The real estate developers’ accounting is strictly and neutrally retrospective. One can point to additional examples of “front-end loading” with respect to casualty and life insurance service premiums, but this would take us outside the business enterprise sector.

The reader should not be surprised to learn that debt restructuring can also lead to quadruple-entry inconsistencies. It must be remembered, however, that this section and all the examples are confined to (external) market transactions. Therefore, we do not show examples of internal revaluation entries, nor do we present examples of debt extinguishment where both the debtor and creditor hold identical views and knowledge of their transaction.¹⁷ Nevertheless it is possible to identify interesting cases that lie within our framework.

For brevity, we show one example which is highly simplified for expository purposes. The example involves a case where the debtor (Unit No. 1) transfers receivables to the creditor (Unit No. 2) in lieu of repaying a commercial loan. The transferor may recognize a gain or a loss on the transaction, but this would

¹⁷See again the brief discussion of revaluation, when debtors and creditors have different views of common financial obligations/claims, at the end of section II.

be an internal accounting matter. So if this were all we would observe:

Unit No. 1		Unit No. 2	
commercial loan (=x)	sale of receivables (=x)	purchase of receivables (=y)	commercial loan (=y)

and quadruple entry is consistent when, $x = y$. If however, the transfer (or sale) of receivables is "with recourse," then FASB guidelines would not permit such consistency. When receivables are sold on a recourse basis the seller is obligated to reacquire the receivables or otherwise compensate the buyer if the receivables are not "collectable." So the seller retains the risks of ownership under recourse arrangements and a sale cannot be registered until a later date when the receivables expire. Thus we now observe:

Unit No. 1		Unit No. 2	
commercial loan cancellation (=x)	commercial loan refunded (=x)	purchase of receivables (=y)	commercial loan cancellation (=y)

since FASB guidelines do not apply to the transferee. Here Unit No. 1, the debtor/transferee, accounts for its sale of receivables with recourse as a simple refinancing transaction of an existing commercial loan. At a later time period consistent quadruple entries will be "restored" by an appropriate internal accounting entry on the part of Unit No. 1 (see section V for further discussion).

It is possible to give additional examples of debt restructuring particularly what are called "troubled" debt restructuring and various kinds of financial "swaps." In these examples we find ourselves on the borderline between market-transaction quadruple entries, and what was previously denoted as a pair of internal revaluation double entries. Such considerations are mentioned later in the paper. Finally, it should be noted that the exposition, so far, has largely adopted a static view of quadruple entries following various types of market transactions. In section V we will briefly analyze the implications of tracing a succession of quadruple entries over a number of time periods. The implications help to identify the critical differences between traditional macroeconomic accounting and a new approach to macroaccounting based on macro/micro linkages.

IV. THE FRENCH "INTERMEDIATE ACCOUNTS" CONNECTION

Readers acquainted with the French system of intermediate accounts will be aware that there are some close connections between the conceptual concerns of this paper and the applied French system. Indeed, in certain respects, the earlier paper of the present writer [Postner (1986)] is even more closely connected to intermediate accounts. Unfortunately the French contribution was entirely overlooked in the earlier paper. Now, however, with the availability of Vanoli (1986, particularly pp. 166-177) we must consider the connection in some detail.

The present writer's knowledge of the French intermediate accounts is based almost entirely on the Vanoli paper.¹⁸ Since the Vanoli paper is so comprehensive and impressive, it would not do justice to the issue to merely summarize the relevant section of that paper. It is also possible that the Vanoli paper is now out-of-date, since the French system of intermediate accounts supported by the "Plan comptable général" is evidently in a state of evolution. Readers, therefore, are best referred directly to the Vanoli paper and to any other relevant material that may now be available. Our strategy in this section is limited to the following. On the basis of this writer's understanding of the Vanoli paper, we make a series of brief assertions which describe the similarities and differences between the rationale of intermediate accounts and the approach adopted in the present paper. For the sake of convenience we designate "intermediate accounts" as the IA-approach (or, simply IA); the approach of this paper is designated the P-approach (or, simply P for Postner).

Both approaches are ultimately concerned with the statistical (accounting) problems of putting macroeconomic accounts on a microdata accounting foundation. Vanoli, however, covers the whole range of sectors encompassed by national economic accounting and his statistical problems of macro/micro linkages also cover the full range of issues. The *P*-approach (at least in this paper) focuses on the business enterprise sector and the statistical (accounting) problems of macro/micro linkages mainly stem from *one* key issue which will be discussed shortly. So for comparative purposes it seems best to concentrate on the business sector. This is also convenient since intermediate accounts mainly arise with respect to the business sector.

The IA-approach is, essentially, to regard the macroenterprise sector as an aggregation of component microbusiness accounts. The term aggregation is evidently meant to denote combination rather than consolidation. The microaccounts are assumed to be reasonably standardized following the various phases of the French General Accounting Plan.¹⁹ This situation is particularly clear with respect to the large business units comprising the nonfinancial corporate subsector. Thus an aggregation of all business units' accounts for this subsector would equal the macroaccounts of the subsector, which is then regarded as an intermediate account. The French system also involves a series of syntheses and arbitrages needed in order to adjust the IA to cohere with the other sectors of national economic accounts. Thus the French IA seems to be very similar to the kind of business enterprise sector envisaged in the present paper, which is again *prior* to the statistical adjustment and data selection procedures required for national accounting coherence.

Once more the French IA for the enterprise subsectors are more comprehensive than the P-approach. IA evidently include non-market as well as market transactions entries; even problems relating to valuation and revaluation aspects of balance sheets are considered. The P-approach concentrates almost exclusively on market transaction statements with the result that many issues relevant to a

¹⁸Also of interest are Lemaire and Weber (1983) and the brief statements of Benedetti and Gerard in OECD (1986, pp. 31-34). Another related French contribution is Arkhipoff (1985).

¹⁹See OECD (1986, pp. 31-33).

complete accounting system are overlooked. This concentration, however, permits a deeper analysis. For example, the P-approach exposes the crucial nature of quadruple-entry bookkeeping and can readily be generalized to handle all sectors of a national economy. The P-approach, in its study of special examples of inconsistency in quadruple entries (see sections III.3 and III.4), becomes almost “micro-micro”; the celebrated transactor/transaction principle is carried to its logical conclusion. Most important, perhaps, this paper offers a specific definition of what is meant by macro/micro linkages.²⁰ Our definition implies that there is a critical difference between IA- and the P-approach to macro/micro linkages: the IA regards aggregation as combination; the present paper regards aggregation as consolidation.

The Vanoli paper contains a valuable exposition of the many practical statistical problems involved in setting up a coherent set of national accounts. In fact a prime purpose of IA is to preserve the original microdata (in an aggregated form) *before* facing the final round of syntheses and arbitrages where the links to microdata tend to get lost. This is a very important empirical contribution. It should be realized, however, that the French system implicitly assumes the need for a fully coherent set of national accounts, where the usual national aggregates are uniquely determined and all national identities are exactly satisfied. We believe that this implicit assumption can be questioned [see also Postner (1986, pp. 241–242)].

The Vanoli paper, with its applied orientation born of first-hand experience, contains interesting comments on problems of “fraud” and related tax evasion in observed microbusiness accounts. The P-approach would appear to be quite naive in this respect. This is because the P-approach is essentially a conceptual one. For example, problems relating to fraud and tax evasion can be overlooked if we consider that the microbusiness accounts are of the management-accounting type. These are the accounts that ultimately influence and measure business economic behaviour, though the accounts may be difficult to obtain by a national statistical agency. Also to a great extent the IA-approach is a reflection of the special business accounting standards imposed in France. The impression of this writer is that French accounting standards appear to be based on the idea of legal form, which can be unambiguously applied by the chosen standards. The P-approach, on the other hand, favours economic substance over legal form, for reasons outlined in sections III.3 and III.4. Accounting standards based on economic substance are difficult to regulate because economic transactions can become very complex and the criteria of economic substance involve subjective elements.

Finally it was mentioned that the P-approach focuses on one key issue relating to macro/micro linkages. In the presence of this issue macro/micro linkages (as defined) tend to break down because quadruple entries are inconsistent. The particular issue concerns the cases where the various parties, to a mutual transaction, have genuinely different views and knowledge of their common market transaction. The reasons for the different views ultimately stem from the economic and institutional (including regulatory) circumstances and

²⁰Actually two definitions are offered in section III.2.

complexity of their transactions, although even simple transactions can generate the same phenomenon. The IA-approach, on the other hand, appears to overlook the phenomenon. Why should the P-approach allow this *one* issue to dominate all other statistical and accounting problems? This question is difficult to answer, because any response would involve personal and intuitive considerations. This writer believes that the particular phenomenon embodies a sort of “hard core” economic reality. The phenomenon provides a kind of ultimate rationale for multi-party economic transactions and simultaneously furnishes us with a “window” for examining the complexity of economic affairs. The various examples worked out in sections III.3 and III.4, even though very simple, can help us “get to know” the very special circumstances of the microdecision unit’s economic life.

V. CONCLUSION: PERPETUAL IMBALANCED ACCOUNTING

The purpose of this concluding section is to sketch out some new ideas that stem from the previous analyses. The treatment of these new ideas is very tentative, but yet the basic consequences seem important. Our description is brief since the new ideas really require an additional paper and a more formal presentation. But the present paper would be seriously incomplete without some acknowledgement of: “where do we go from here?” This is also a good opportunity to take a broader view of the issues surrounding macro/micro linkages which, so far, have been limited to the business enterprise sector.

At first glance it may appear that macro/micro linkages cannot be consistently constructed for the business sector. There are many examples where quadruple entries break down; total recorded sales within the enterprise sector do not generally equal total recorded purchases within the same sector based on the quadruple entries that underlie the sector’s microbusiness accounting foundation. So, considering only this one aspect, a consolidated production account for the macroenterprise sector cannot be developed on a microdata foundation. This also has the consequence that national aggregates, such as gross domestic product, cannot be extracted in a unique manner.

Now it is possible to object that the isolated examples of inconsistent quadruple entries (given in section III) are either untypical or somehow disappear upon aggregation within a given time period. This writer feels that the examples are not untypical, but no proof is offered at this moment (see further discussion to follow). On the other hand, it is true that “the aggregation of all quadruple entries” is what counts in macro/micro accounting. After all, the quadruple entries furnish the basic material that goes into the various microbusiness accounts, but only in a highly aggregated (combined) form. Is it not possible, therefore, for these literally billions of basic quadruple entries, underlying market transactions within the business sector, to offer opportunities for minimization, or even cancellation, of inconsistencies when put together in grand aggregate form? Indeed this kind of belief, in one form or another, is itself a typical one among applied economists. This writer would prefer not to adopt this particular belief. Nor is it necessary to adopt this belief, because there are opportunities for cancellation of inconsistencies other than of the type described above. The

opportunities for cancellation occur more as a result of intertemporal aggregation over successive time periods than as a result of aggregation of quadruple entries within a given period of time.

If one were to review the examples of quadruple-entry inconsistencies worked out in section III, one common feature would be as follows. One of the microbusiness units takes a retrospective view of the relevant transaction, while the other unit takes a prospective view. This is with reference to their transaction as recorded in the “initial” time period. At a “later” time period, the originally retrospective view catches up with the prospective view, and this “catching up” is implemented by an appropriate (internal) double entry in the accounts of the retrospective transactor. This double entry must be included in the transactor’s market transaction statement since both entries involve market transaction categories, though the entries, strictly speaking, are not directly part of an external market transaction. In this situation, the intertemporal aggregation of the original inconsistent quadruple entry with the later double entry yields a new set of debit/credit entries that would be consistent. There is, in effect, cancellation of inconsistencies due to intertemporal aggregation. But in each of the two time periods, the “initial” and the “later” periods, the recorded debit/credit transaction entries are inconsistent, or, imbalanced. This phenomenon is called *perpetual imbalanced accounting*.

Another common feature of some examples in section III is more interesting.²¹ Here the two transactors adopt divergent views concerning the economic substance of their transaction and this leads to a sequence of accommodating quadruple entries. In these cases the direct intertemporal aggregation of the time sequence composed of sets of inconsistent quadruple entries would eventually yield the following. For each transaction flow category, total debits equal total credits, which is what we mean by consistency. The inconsistencies, in effect, cancel out without the need for additional double entries, but with the need for completing the sequence of inconsistent quadruple entries. (It would appear, however, that for long time sequences such aggregation must embody the utilization of a discount factor so that intertemporal transactions can be put on a present valuation basis.²²) Again, each component set of the time sequence is characterized by some inconsistency—perpetual imbalanced accounting. This, however, does not imply that each and every transaction category involved in the quadruple entries must be imbalanced in each time period. In section III there are examples of particular transaction categories that are characterized by “perpetual balanced accounting.” Such examples, though, are the exception rather than the rule.

The above considerations have important consequences. First it appears that the basic problem of inconsistent quadruple entries, and therefore the potential for unsuccessful macro/micro linkages, would be more severe when accounting for short time periods (say, the quarter) than when accounting for long time periods (say, the year). Does this, however, imply that all such inconsistencies would disappear (by cancellation) if the accounting period were “sufficiently

²¹There is no space in this paper to analyze each of the examples in turn.

²²This consideration has not yet been fully worked out.

long?" The answer to this key question can now be stated. Some complex economic transactions may take many years to eventually balance out and each annual period would be subject to some transaction category imbalances. But most important, any time period, no matter how long, is open to quadruple-entry inconsistencies even with an implied intratemporal aggregation. Within any time period, those sequences of quadruple (and double) entries where the *full cycle* of inconsistencies is permitted to both begin and end—these would balance out by an implied intratemporal aggregation. However, in any finite time period, some sources of transaction imbalance would be just finishing; other sources of transaction imbalance would be just beginning. In these cases where the full sequential cycle of inconsistencies is not recorded (and such cases cannot be avoided no matter how long the time period)—then the implied intratemporal aggregation is not effective. So the basic problem of macro/micro linkages analyzed in this paper can never be entirely avoided.

The theory of Perpetual Imbalanced Accounting (PIA), that we have tentatively developed, can be compared in a very modest way with some notions from the theory of General Economic Equilibrium (GEE). The latter theory embodies Walras' law: the supply of all commodities taken and evaluated together, including the supply of financial instruments and money, is identically equal to the total demand for all of them. It follows from Walras' law that when some commodity is in excess supply, there must be at least one other commodity in excess demand. The national market transaction statement, underlying PIA, has an analogous property: the total debits of all transaction categories taken together is identically equal to the total credits of all transaction categories. An imbalance with respect to one category must be offset by a counter imbalance with respect to another category [see Postner (1986, pp. 228-229)]. Say's law implies that there is always zero excess demand for and supply of money. The analogue of PIA implies that the transaction category designated "demand deposits" is in perpetual balance. There is, however, a critical difference between PIA and GEE. In the latter theory when there is, say, excess demand for a commodity, then the *price mechanism* works to eliminate the excess demand in a future period. With PIA when there is, say, a situation where the debit total for a transaction category is greater than the credit total for the same category (i.e. inconsistent entries), then the *accounting mechanism* triggers a chain of reactions, *not* towards eliminating the inconsistency, but towards producing an equal and opposite inconsistency in a future time period. Other similarities and differences between PIA and GEE can also be shown including the question of time discount factors.

So far the scope of this paper has been confined to the business enterprise sector. This sector is a good place to begin the study of macro/micro linkages, where microaccounting records are kept and regulated and where we can reasonably refer to the different conceptions and perceptions adopted by the microunits with respect to their mutual transactions. In this context the theory of PIA seems to have direct application, but there is no reason to be permanently confined within this sector. We have, in effect, overlooked all other sectors of the national economy including transactions between the business sector and the other sectors. It appears to this writer that there are many controversial national accounting issues that can be translated into the language of PIA and so may be clarified

by application of the tools described here. See, for example, Ruggles and Ruggles (1968, p. 258) for some background discussion.

Finally, the scope of the paper has been largely limited to market transactions, strictly defined.²³ However, it is easy to incorporate most of the purely internal accounting entries, including the various interlocking entries, within our framework without losing anything of substance. Even the national accountant's imputed and attributed accounting entries can be incorporated, though this would tend to blur some essential aspects of our analysis. When, however, we come to revaluation entries, then some subtleties must be faced. Indeed it turns out, on the basis of PIA, that when quadruple entries are seriously inconsistent, that the essential meaning of the term "market transaction" must be extended. Such extensions come close to embodying the elements of revaluation entries and the theory of PIA again furnishes a new technique for deeper analysis. In particular PIA might resolve the mystery of what *eventually* happens when the debtor and creditor of a mutual financial instrument adopt different views with respect to revaluation. More generally, even the booming phenomena of realized and unrealized capital gains can now be re-examined. The key question appears to be: can there be capital gains on the part of one "transactor" without somehow also accounting for the eventual appearance of corresponding and implicit "capital losses" on the part of other "transactors?" Such a system requires a dynamic and temporally global context.

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²³We do include in market transactions the internal double entries that serve to eventually balance the retrospective and prospective views of mutual transactions (see early part of this section).

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