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BOOKKEEPING CONVENTIONS AND THE MICRO-MACRO LINK

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The formal accounting logic of the national accounts and other macroeconomic statistics is not always well understood. In addition, the relation between macro statistics and micro accounting data often is not clear. This paper starts out by summarizing the main bookkeeping conventions at the macro level. A distinction is made between vertical and horizontal double-entry bookkeeping, which, if applied simultaneously, result in quadruple-entry bookkeeping. Vertical bookkeeping refers to the double-entry bookkeeping used in business practice. Horizontal bookkeeping requires that the transactions and other economic relationships between agents answer strict consistency rules regarding valuation, timing, and classification. At the micro level, this consistency is not guaranteed. The article reviews three options to reinforce the micro-macro link (proposals by Nancy and Richard Ruggles, proposals by Harry Postner, and the intermediate accounts in France), and concludes with a few suggestions that could be used in the upcoming revisions of the international statistical manuals.

1. Introduction

Bookkeeping is the activity of keeping systematic records of economic assets, liabilities, and transactions to inform those that make economic decisions. Both enterprises and macroeconomic statistical systems make use of bookkeeping. However, while many works have been written about business accounting, the formal rules underlying macroeconomic statistics remain rather obscure, even for those making regular use of these data. Many people are nonetheless aware that there are differences between business accounting and macro accounting, which raises the questions about their causes and whether these differences can be avoided.

The purpose of this paper is to explain the broad bookkeeping principles underlying macroeconomic statistics such as the national accounts. It discusses the main reasons behind the disparity between micro and macro bookkeeping, as well as various suggestions made to bridge the gap. The structure of the paper is as follows. Section 2 provides some historical background on double-entry bookkeeping and indicates how the traditional principle of double-entry bookkeeping is applied in macroeconomic statistics (vertical bookkeeping). Section 3 introduces a second type of double-entry bookkeeping, namely, the one that ensures consistent recording of the mutual economic relationships between the units that are covered by macroeconomic statistics (horizontal bookkeeping). This section also

Note: The views expressed in this article are those of the authors and do not necessarily represent those of the International Monetary Fund.

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investigates the consequences of the simultaneous application of both types of bookkeeping (quadruple bookkeeping). Section 4 discusses in some detail the differences between bookkeeping practices generally followed by enterprises and those underlying macroeconomic statistics. Section 5 presents three ways of improving the micro-macro link. These involve the views promoted by Nancy and Richard Ruggles, the proposals made by Harry Postner, and making the differences between micro and macro data explicit with the help of an intermediate system. The final section contains our conclusions and recommendations.

2. Vertical Double-entry Bookkeeping

Vertical double-entry bookkeeping, as we use the term here, is the same as double-entry bookkeeping *tout court* used in business practice. The adjective "vertical" makes the distinction with a second concept of double-entry bookkeeping, which will be discussed in Section 3.

2.1. *A Bit of History*

Although traces of "keeping the books" go back thousands of years, many consider modern accounting to have started with double-entry bookkeeping.[1] The method came into use by Italian traders and bankers around 1250–1350 and may have been adopted from Arab merchants. The first printed explanation of the method is in *Summa de Arithmetica, Geometrica, Proportioni et Proportionalita* (Compendium of arithmetic, geometry, and proportions and proportionality) written by the Franciscan monk Fra Luca Pacioli[2] and published in November 1494.

In the *Summa*, Pacioli recommends that before starting business an inventory be drawn up of all assets and debts. The inventory should relate to a particular day, record assets at current market value, and be arranged according to mobility and value. All transactions should be recorded in a book called the Memorial at the moment they occurred, and later entered in another book, the Journal. The essential feature was that the Journal adds, next to the description of the transaction, a double allocation of the occurrence: once as an addition (debit) and once as a deduction (credit).[3]

One of the advantages of double-entry bookkeeping is that it integrates changes in financial claims and liabilities with the accounting for non-financial assets. Double-entry bookkeeping therefore works well when many transactions are conducted on credit (which was the case in fifteenth-century Italy), and other situations in which it is important to keep track of accruals.

Another property of double-entry bookkeeping is that it allows direct accounting for changes in equity (sometimes the words "capital" or "net worth" are used instead of "equity"). Note that, because equity is treated as if it were a

[1]This section is based on Ten Have (1973) and Alexander (undated).

[2]The name is sometimes written as Luca Paccioli or Luca Paciolo.

[3]This was the Venetian way of recording. In other Italian cities, debit and credit amounts were usually written in different columns on the same page. As in many accounts either the number of debit or credit entries strongly dominates, the latter procedure avoids the waste of valuable paper.

TABLE 1

EXAMPLE OF A MORE SIMPLE SET OF RULES TAUGHT TO YOUNG ACCOUNTANTS

Type of Accounts	Debit is used for:	Credit is used for:
Assets	Opening balance and increases	Decreases and closing balance
Liabilities	Decreases and closing balance	Opening balance and increases
Equity	Losses and closing balance	Opening balance and gains

Source: Ten Have (1973, p. 115), discussing Volmer.

liability to the owner of the enterprise, the increase in the value of equity is treated as a credit item. This feature, together with other complications, has confused many generations of bookkeepers. Over the centuries, authors have tried to come up with rules to help making the correct entries. Table 1 contains an example of one of a more simple set of rules taught to young accountants (see Ten Have (1973, p. 115), discussing Volmer).

In business accounting, it is often not practical to debit and credit the equity account on a continuing basis. Therefore, an Income statement (or Profit and loss statement) is drawn up on a periodic basis, say once a month. This statement links, on the basis of information extracted from the Ledger, the revenue earned in the period to the costs incurred to earn the revenue. The net profit together with other income elements is then transferred to the equity item in the enterprise's Balance sheet.

2.2. *Application in Macroeconomic Statistics*

How is double-entry bookkeeping, which has been standard practice in business accounting for several centuries, reflected in macroeconomic statistics?

A discussion probably starts best from a closer look at the opening Balance sheet defined by the *System of National Accounts 1993* (*1993 SNA*). This table lists the values of all assets and all liabilities of a particular institutional unit, or group of similar institutional units, at the point in time at which the registration period begins. In the T-format presentation, the assets (produced assets, non-produced non-financial assets, and financial assets) owned by the institutional unit are by convention recorded on the left-hand side and its liabilities are shown on the right-hand side. Only by exception will the value of all assets be equal to all liabilities. The difference between the two, called the net worth of the institutional unit, is entered on the right-hand side of the Balance sheet, thus balancing both sides of the account. The identity created this way can be expressed as an equation:

$$\text{AN} + \text{AF(assets)} \equiv \text{AF(liabilities)} + \text{NW} \tag{1}$$

in which AN stands for non-financial assets owned, AF (assets) for financial assets owned, AF (liabilities) for financial liabilities, and NW for net worth. Simplifying equation (1), one gets

$$\text{AN} + \text{AF} - \text{NW} \equiv 0 \tag{2}$$

where AF stands for net financial assets. Equation (2) is the basic expression of the accounting equilibrium that the national accounts maintain at all times for any

institutional unit. The balancing identity is most apparent in the opening and closing Balance sheets for stock data and in the table "Changes in balance sheet" for the flow data (tables IV.1–IV.3 in the *1993 SNA* sequence of accounts, pp. 612–13). The Changes in balance sheet accounts can be conceived as the recapitulation of all changes in assets, liabilities, and the unit's net worth caused by events that take place during the recording period.

It may be obvious that the system of recording flows following the balancing identity is the same as Pacioli's double-entry bookkeeping. The main characteristic is that each event necessarily leads to at least two entries. To use the previous example, the cash sale of a good leads to a decrease in holdings of AN and an increase in the value of AF. The purchase of shares by charging the unit's bank account leads to two entries in AF, namely an increase of holdings of shares and a decrease of holdings of deposits. The donation of food to another unit or the destruction of a building by an earthquake causes not only AN to diminish in value, but also NW.

The other accounts in the full sequence of *1993 SNA* accounts provide more detail than in the Changes in balance sheet account, but they retain the basic principle. For changes as a result of transactions, the equivalent of the Changes in balance sheet account is the Capital account (see Figure 1), in other words, the Capital Account summarizes the final outcomes of the various transaction accounts. The goods and services account details the Capital Account's changes in AN. The Financial account contains an itemization of the AF-variable by type of financial instrument. The Production account through the Use of income account (including those transfers that are recorded in the Capital account) itemize

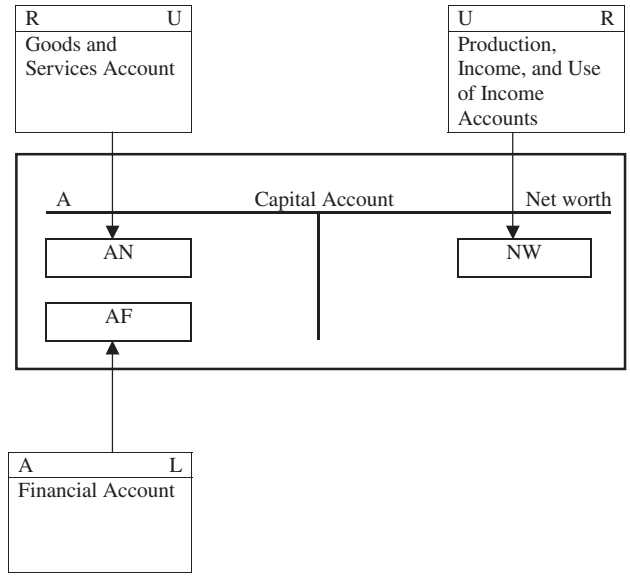

Figure 1. The Central Position of the Capital Account in Explaining the Changes between the Opening and Closing Balance Sheets that Result from Transactions

Note: R, Resources; U, Uses; A, Assets; L, Liabilities.

variable NW by transaction category, and can be seen as the national accounts equivalent of the Income statement in business accounting (with the exception that business income statement may also include holding gains and other changes in volume of assets). The entries in this set of accounts are often seen as the very heart of the national accounts because they contain the most essential analytical information on the performance of institutional units during the recording period.

The T-format in the national accounts retains the conventions adopted in the Middle Ages. Acquisitions appear on the left-hand side of the Goods and services account, and disposals (intermediate consumption, final consumption, exports), plus capital formation that is transferred to the next accounting period appear on the right-hand side. Changes in financial assets are recorded on the left side of the Financial account, while changes in liabilities are on the right side. In the production and income accounts, increases in net worth (resources) are entered on the right-hand side and decreases (uses) on the left-hand side in parallel with the equity account in business bookkeeping.

The *1993 SNA* groups the transaction categories underlying changes in net worth due to saving and capital transfers in a number of accounts. This is done in order to generate a series of balancing items of economic interest. An example is the balancing item Value added with which the Production account closes. The balancing items are not directly transferred to Net worth, but rather carried over as an opening item in the following account. In this way, they gradually snowball towards the Capital account. A similar treatment is found in Anglo-American business bookkeeping where the Income statement usually first determines Gross profit as the balance of sales and costs of sales, and then subsequently computes Operating income, Net income on ordinary activities, and Net profits after taxation.

The vertical double-entry bookkeeping practices in the *balance of payments statistics* are somewhat less close to business double-entry bookkeeping than the sector accounts. The reason is that not all assets and liabilities of the national economy are taken into consideration, but only those stocks and flows in which the counterparty is a non-resident. Thus, the item Net worth is not defined. Nonetheless the International Investment Position statement, providing an overview of all stocks of financial claims and liabilities vis-à-vis the rest of the world, bears close resemblance with a balance sheet as it applies the basic expression

$$\text{AF(assets)} - \text{AF(liabilities)} \equiv \text{NIIP} \tag{3}$$

where NIIP is the net international investment position. The flow accounts again maintain this equilibrium by entering all transactions and other accounting flows twice. A balancing item Changes in NIIP is not explicitly defined, although for transactions it is equal to the sum of the current transactions and net capital transfers received. The two sides of the flow accounts carry the rather nondescript headings of credit (on the left-hand side) and debit (on the right-hand side).[4]

[4]This feature does not facilitate the understanding of the balance of payments by nonspecialists. It also may have contributed to a vexing mistake in the tables relating the accounts of the *1993 SNA* and the fifth edition of the *Balance of Payments Manual*, which was only set right on occasion of the amendment of both manuals for the treatment of financial derivatives.

The double-entry bookkeeping practices of the *Government Finance Statistics Manual 2001* (*GFSM 2001*) are obvious. Opening and closing balance sheets are defined, as well as a Statement of government operations and a Statement of other economic flows. Where in the *1993 SNA* the addition to net worth is somewhat hidden as a column total in the Capital account, the Statement of Government Operations shows a clear Operating balance of the transactions affecting net worth. Neither the notions of debit and credit, nor those of left and right are used, as Revenue and Expense items are listed one below the other. The *GFSM 2001* defines "revenue" as "all transactions that increase net worth of the general government sector."

To complete this overview of the main macroeconomic statistics, we should mention that the overall bookkeeping rules in the *Monetary and Financial Statistics Manual* (*MFSM*), published in 2000 by the International Monetary Fund, are identical to those in the *1993 SNA*.

3. Horizontal Double-entry and Quadruple-entry Bookkeeping

Horizontal double-entry bookkeeping is not a traditional term. However, we use it here because the expression "double-entry bookkeeping" has been used, maybe incorrectly, for compiling accounts that reflect the mutual economic relationships between different institutional units in a consistent way. Thus, horizontal double-entry bookkeeping implies that if unit A provides something to unit B, the accounts of both A and B show the transaction for the same amount: as a payment in A's accounts and as a receipt in B's accounts.[5]

Quadruple-entry bookkeeping, then, is a system encompassing both vertical and horizontal bookkeeping. A quadruple-entry accounting system deals in a coherent way with multiple transactors or groups of transactors, each of which practices vertical double-entry bookkeeping. A single transaction between two counterparties thus gives rise to four entries in the system as a whole.

3.1. *A Bit of History*

The idea that flows between groups of agents need to be recorded consistently may be older in the national accounts than vertical bookkeeping. This is because traditionally national accounts were mainly concerned with income, production, and consumption. Interest in financial processes remained very limited for a long time. The item Net lending with which the accounts closed had therefore more the character of a balancing item than of an integral part of the accounting system that could be estimated directly. On the other hand, it was early realized that major groups of transactors engage in transactions with each other. Inspired by the dis-

[5]Sometimes, the *1993 SNA* recommends to combine, partition, consolidate, or reroute transactions. This complicates the application of the rule given here, but does not affect its validity. One such complication is posed by the *SNA*'s special valuation rules for goods. For instance, the *SNA* values output at producers' prices, but the use of goods at purchasers' prices. The sum of an item's producer price, transport margins, and trade margins recorded as separate transactions and involving different units at the supply side is equal to the purchasers' price shown as a single value at the uses side. Making this combination at the uses side is the only possibility in the absence of a from-whom-to-whom specification in the accounts; the input-output tables show the underlying transactions explicitly.

covery of the blood circulation that highlighted the interdependencies of the various organs in a body, François Quesnay, physician to the French king, published his *Tableau Économique* in 1760. This economic table shows income and expenditure flowing between the productive class (agricultural labor), proprietors (landowners, government officials, and the church), and the sterile class (all other people). The matrix format of the table ensured that what one class pays to the second, necessarily is equal to what the second class receives from the first. This type of consistency has remained an obvious feature of other matrix presentations, in particular the input-output tables.

Around the second world war, a national accounts system that included, in addition to the national aggregates, a description of transactions conducted by the main sectors was often referred to as "social accounts." Stone (1947) indicates that it is believed that J. R. Hicks used the term first in *The Social Framework: An Introduction to Economics* of 1942.[6] However, Stone himself did much to develop this disaggregation of the hitherto often monolithic approach to national accounting. Studenski (1958) mentions: "The development of the idea of a double-entry national account of income and expenditure for the whole economy led to the subsidiary idea of constructing similar double-entry accounts of income and expenditure for each sector of the economy. Actually, these two ideas were conceived simultaneously by the same group of English Economists—Meade, Stone and Kaldor—under Keynes's guidance. But of the two ideas, in the United Kingdom only the first—that of a national account—was given immediate official approval."[7] In spite of the fact that vertical double-entry bookkeeping appeared to be the major concern, Stone's 1947 system clearly applies horizontal double-entry bookkeeping: "In this system every transaction will be recorded twice: at the receiving and at the paying end."

3.2. *The Principles*

In contrast to business bookkeeping, macroeconomic statistics account for a multitude of units in parallel. This requires special care from a consistency point of view, particularly in those instances when units engage in transactions between each other or when they are otherwise mutually involved. As the financial asset of one unit is mirrored in a liability of another unit, for instance, they should be identically valued, allocated in time, and classified to avoid inconsistencies in aggregating the Balance sheets of units into sectoral or national totals. The same is also true for all flows that take place between two units.

These requirements apply whether or not the macroeconomic statistics consolidate the stocks and flows of the units they cover, and whether or not they show any subgroups of units within the overall total. However, consolidation is clearly impossible without consistency in the basic data, and the requirements of consistency are more obvious when sectoral data are presented than if one would only see the highest level aggregates. For instance, if the accounts for the government sector show the payment of a subsidy to the non-financial corporations sector, one expects to also find this subsidy as a receipt in the accounts for the non-financial

[6]In a footnote on page 23.
[7]Studenski (1958, p. 154).

corporations sector. The explicit appearance of the same transaction with two sectors rightfully justifies the label of horizontal double-entry bookkeeping. The principle is fully applicable in the national accounts, monetary statistics, and government finance statistics. The balance of payments poses a different case, because by definition it does not cover economic relationships among the units over which the aggregation takes place (that is, resident units in so far they transact with nonresidents). Only if there is the need to consolidate the data for several countries into a regional statement or when an analysis of external stocks and flows from a world perspective has to be made, there is a rationale for applying horizontal double-entry bookkeeping in the balance of payments.

As indicated earlier, *quadruple-entry bookkeeping* then simply is the simultaneous application of vertical and horizontal bookkeeping. For example, when two units are involved in a simple cash sale of a good, the following entries should be made:

(1) A decrease in goods in the accounts of the former owner of the good.
(2) An increase in currency and deposits in the accounts of the former owner of the good.
(3) An increase in goods in the accounts of the new owner of the good.
(4) A decrease in currency and deposits in the accounts of the new owner of the good.

All four entries have to be of the same value and have to be made concurrently.

It should be stressed that the above is a description of the conceptual accounting framework and not the way entries are made in reality. As stated in paragraph 2.62 of the *1993 SNA*, the accounts of the nation are not kept in the same way as those of a business or government unit. The simple reason is that the necessary source data are not available. (We should note that even if they are available it would not be possible to use them entirely due to practical problems and some other conceptual differences, such as historic vs. current replacement cost concepts.) The inconsistencies that result from the use of different, or even missing, sources for the various parts of the national accounts are a major concern in drawing up the accounts and balance sheets in practice. On the other hand, the properties of the accounting system often allow the national accountant to make estimates even in situations where no direct source information is available.

4. Where Micro and Macro Bookkeeping Separate

This section discusses in some detail the differences between bookkeeping practices generally followed by enterprises and those underlying macroeconomic statistics. The first subsection elaborates on the most obvious difference, namely, that business accounts are drawn up for a single unit and macroeconomic statistics cover the activities of many units. Macroeconomic statistics are not a simple aggregation of micro accounts. Even if all micro bookkeeping data were perfectly consistent with each other, they may still have to be adapted to fit the economic principles on which the macro statistics are built. A number of subsections illustrate this aspect by successively reviewing micro-macro differences in the treatment of internal transactions, non-transaction gains and losses, imputations, scope and presentation issues, and finally, the existence of additional accounting rules.

4.1. *Accounting for One versus Many Units*

Every accounting system has to answer a set of rules that guarantee internal consistency. The application of vertical double-entry bookkeeping by an individual enterprise requires that the two entries made in respect for every single transaction are recorded at same value and for the same date. The enterprise's Income statement should be consistent with the Balance sheet. In addition, flows and stocks with the similar economic characteristics should always be classified in the same category.

Macroeconomic accounts group the flow and stock data of individual units into sectoral and national aggregates. Without applying strict consistency rules, it is impossible to give a proper interpretation to these aggregates.[8] On top of the consistency rules from applying vertical double-entry bookkeeping for all individual units, quadruple-entry bookkeeping requires that each economic flow or stock is measured identically for the parties involved with respect to valuation, timing, and classification.[9] Micro data do not necessarily meet these requirements, as the following examples show.

Differences in valuation: While monetary transactions probably would not give rise to major disparities, inconsistencies in valuation often occur in barter transactions as well as financial assets/liabilities. For instance, government units may record their debt at face values rather than at market values, and regulatory authorities may prescribe that creditors value troubled loans differently than the debtors do. Differences of valuation may also be due to the involvement of intermediaries.

Differences in timing: The international guidelines have long recognized "float," the time that checks are in the mail, as a cause of differences in the timing of transactions. More important may be the matching principle applied in business accounting with respect to revenues and related costs, resulting in disparities in the time the underlying transactions are recognized.

Difference in classification: These are mostly related to how the parties view their mutual transactions. For example, financial institutions often regard interest and insurance transactions totally different from their clients. Depending on the situation, interest swaps may be interpreted as an income transaction or a transaction in financial instruments.

It should be recognized that significant achievements have been made, even at the international level, to come to more uniform business accounting standards. Accordingly, disparities between individual micro accounts tend to gradually disappear. Still, it should be borne in mind that accounting standards are geared towards individual accounts and therefore not necessarily assure inter-unit consistency. Current standards prescribe that loans be treated differently depending on whether it appears as a credit or a debit. Such is unacceptable in a consistent horizontal double-entry bookkeeping system. Tax and supervisory regulations are a second source for harmonization of accounting practices. However, in so far as

[8]The unorthodox views of Postner and others will be discussed in a later section.

[9]However, the classifications applied by the two units involved in mutual transactions may differ due to "collapsing," which is discussed in Section 4.2.

these rules differentiate between specific sections of the economy, they also may be a cause for discrepancies between micro accounts.

In some cases, it seems impossible that micro accounts be in harmony with each other. One of these relates to how company shares should be valued: at intrinsic values such as corporations themselves see it, or at prices quoted on the stock market, which investors prefer. The requirement of horizontal consistency may then force the macro system to make a choice even if that choice has awkward implications from an analytical point of view in parts of the overall system. For example, the choice made in the national accounts to record shares at market value has the consequence that corporations are attributed a net worth that tends to be the smaller, the higher is the companies' profit generating capacity.

4.2. *Internal Transactions*

For the purpose of economic analysis, macro accounts may record certain types of "internal transactions," which one would not find back in micro accounts. Paragraph 3.44 of the *1993 SNA* defines internal transactions as certain kinds of actions within a unit to give a more analytically useful picture of final uses of output and of production. The *1993 SNA* then gives a number of examples, including own-account production within households for purposes of final consumption, non-market production by government and non-profit institutions serving households, own-account capital formation, and goods and services produced by one establishment and delivered to another establishment within the same enterprise.

It is surprising the *1993 SNA* does not mention the *production process*, that is, the transformation of goods and services into other goods and services, as involving internal transactions. However, such clearly is the case in view of the distinction the *1993 SNA* makes between acquisition of goods and their use in production, as well as the output of goods and their disbursement. The principle the *1993 SNA* follows can be best explained by assuming that all inputs in the production process originate from materials and supplies held in inventories, and all output concerns goods that are added to the inventories of finished products. If the value of inputs is 10 and the value of outputs is 15, the following two sets of entries are made. First, goods are taken from inventories and enter the transformation process.

NF (inventories)	–10	NW (intermediate consumption)	–10
AF	0		

Second, the transformation process generates an output, which is added to the inventories.

NF (inventories)	+15	NW (output)	+15
AF	0		

All entries reflect processes that take place within the institutional unit, so they are purely internal.

The *1993 SNA* "collapses" internal and external transactions in goods and services into a single set of entries. For instance, if the items exiting the transformation process in the example above were all market services, the counter-entries for the output would be in financial assets. The change in financial assets is mirrored in the accounts of the unit that purchases the services, but the output is not. Collapsing therefore disrupts the symmetrical classification of transactions required by horizontal double bookkeeping. This disadvantage can easily be remedied, however, by supplementing the sequence of accounts for institutional sectors with a Goods and services account. This would make purchases and sales of goods and services explicit, restoring full symmetrical treatment. Thus, the selling party will record sales and acquisition of financial assets, while the purchasing party will record purchases and a reduction in financial assets.

Business accounting normally recognizes profit at the times external transactions (sales) are effectuated. In the Income statement, business accounting matches sales with the costs of sales. These costs, although essentially external transactions, are not necessarily allocated to the recording period in which they are effectuated. Thus, the matching process underlying the Income statement also recognizes elements of "internal" transactions.

A closer look at the examples of internal transactions mentioned in the *1993 SNA* reveals that they are of very different natures. Own-account capital formation is treated similarly as described above for the output entering inventories. *Own-account output of consumption goods and services* leads to two entries in net worth because final consumption goods and services are supposed to be used up the same moment they are acquired by the consuming unit.

NF	0	NW (output)	+15
AF	0	NW (final consumption)	–15

It should be noted that the entries made in respect of purchased final consumption goods and services also combine external (the purchase) and internal (the using-up) characteristics.

The gross recording of *output delivered between two establishments* belonging to the same institutional unit relies on a pure convention.[10] In case it concerns services, the following entries could result.

NF	0	NW (output first establishment)	+15
AF	0	NW (intermediate consumption second enterprise)	–15

[10]In business accounting, the recording of internal transactions is often done for the purposes of calculating the price of output. This process allocates external costs to departments (or more precise, cost centers), culminating in an estimation of the cost of produced goods and services. The addition of a profit margin provides a sale price for these goods and services. This type of calculation, however, is not part of normal financial reporting.

Output of one department that is used in another department within the same establishment is not recorded in the national accounts. Still, when there is a considerable time lag between the output and use, at least in principle an temporary non-financial item "work in progress" should be recorded. Any holding gains or losses on this work in progress should be recorded in the revaluation accounts.

4.3. *Non-Transaction Gains and Losses*

The treatment of non-transaction gains and losses is another cause of differences between business accounts and macroeconomic accounts. Business accounting recognizes the existence of various types of gains and losses that are not the result of external or internal transactions. Examples are losses in production, bad debts, depreciation, and extraordinary gains.

Losses in production can refer to losses related to transportation, deterioration of quality during storage, spoilage by insects or rodents, small-scale accidents and theft, etc. As these losses are normal costs of doing business, they lead to reductions in the enterprise's value added. The *1993 SNA* does not show them explicitly, though. Instead, the losses of materials and supplies are included in intermediate consumption, and the losses of produced products are not included in output. A pizza baker's intermediate consumption includes the dough that was spoiled because it fell on ground and conversely his output excludes the pizzas baked for which no customers were found. Although it would be interesting to know the values of these losses, it would overburden the system to record them in macroeconomic statistics. Thus, accounting for intermediate consumption and output is not equal to describing the physical transformation process itself, but rather the wider economic implications of this process.

Customers that do not pay their bills are a common phenomenon and therefore are a normal cost of doing business as well. In contrast to the examples given in the previous paragraph, *bad debts* imply losses on financial assets rather than on goods and services entering or emerging from the production process. For this reason it is impossible to account for them in the values of intermediate consumption or output. In fact, the *1993 SNA* has not found a good solution for the occurrence of normal levels of bad debt. If financial claims are fully lost, the *1993 SNA* records an "other change in the volume of assets," which makes it impossible to reduce operating surplus for the occurrence of bad debt.[11] The national accounts therefore give a too rosy view of enterprise performance. Business accounts, on the other hand, usually expense bad debt and are more satisfactory in this respect.

Depreciation is a cost that can either be interpreted as an internal transaction or as a type of loss linked to production. The *1993 SNA* classifies it as an "other accumulation entry." The purpose of the concept is to account for reductions in the value of durable production items due to wear and tear, as well as their gradual economic obsolescence. In Pacioli's time, and in fact until the industrial revolu-

[11]The Intersecretariat Working Group on National Accounts has instituted an electronic discussion group that will make suggestions to improve the accounting for bad debt and nonperforming loans. See http://www.imf.org/external/np/sta/npl/eng/discuss/index.htm.

tion, there was no necessity of making depreciation allowances. Businessmen used to own very few capital goods and the items tended to have very long economic lives.[12] Of course, the financing of a ship was a considerable investment, but the unpredictable perils of weather and pirates made it nearly impossible to establish a "normal" pattern of wear and tear.

In our times, accounting for depreciation is a standard procedure in both business accounting and in the national accounts. From a bookkeeping point of view, the treatment is alike: the holdings of non-financial assets and Net worth diminish for the same amount. However, the valuation and time allocation usually differ. Business accounts still tend to calculate the gradual loss on the value of machinery, buildings, and other durables on the basis of their acquisition costs. Furthermore, the pattern of depreciation may be heavily influenced by tax regulations. In the national accounts, "consumption of fixed capital" is determined as an accrued loss on the current values of the durables. Even though national accountants have given much attention to the correct methods of calculating consumption of fixed capital, many users prefer to stick to aggregates, such as gross domestic product, that do not encompass this production cost.

The national accounts keep the transaction accounts completely separate from (i) holding gains/losses from changes in prices and (ii) other changes in the volume of assets. So there are *three parallel systems* that each serve to record a specific type of flows. They all follow the principles of quadruple-entry bookkeeping, and taken together they explain the differences between the opening and closing Balance sheets. The national accounts do not define any balancing items that are combinations of elements from the three systems. Such watersheds do not exist in business bookkeeping. As we have seen with the treatment of bad debt, business accounts have the advantage of freely combining transactions with other gains and losses to arrive at analytically useful indicators. On the other hand, business accounts may ignore the existence of certain types of flow entirely. An enterprise adhering to historic cost accounting turns a blind eye to holding gains or losses due to inflation. This may severely distort its Income account and Balance sheets.

4.4. *Imputations*

Macroeconomic bookkeeping includes many deviations from the "transactor-transaction" approach, that is, from the principle of recording of flows (i) with the units that obviously provide or receive an item of economic value, (ii) under a single classification category, and (iii) at their observable values.

These "imputations" are mainly found in the income accounts. Some refer to the recording of a payment with other units than those that receive or pay the money. An example is the payments of employers' social contributions to social insurance funds. These are rerouted as if the employers made the payments to their employees, which subsequently pay the amounts to the social insurance funds.

[12]Ten Have (1973) jokingly notes that the mid-sixteenth century printer Christoffer Plantin's presses are still being used to produce ordinances etc. for tourists.

Other imputations record flows that are invisible, such as rents that owner-occupiers are supposed to pay themselves. Another example are the profits from direct investment companies abroad that are recorded as if paid out as property income to the owners and then reinvested in the companies. Still other imputations have the character of attributions, such as the allocation of consumption of pension fund services to certain units, even if they did not make identifiable payments to that effect.

The macro systems introduce imputations to show underlying economic realities, even when they are not evidenced by money flows. Business accounting may also make imputations, for instance regarding the relations with companies they control, but these are not of the magnitude found in macro systems. Private households when making economic decisions are unlikely to recognize several of the "economic realities" that the macroeconomic systems want to portray by introducing imputations.

4.5. *Scope and Presentation*

The level of flow detail and the balancing items in the macro systems are larger than in published business accounts. This is also very true for the detail by type of goods and services. On the other hand, the detail of financial assets and liabilities in the Balance sheets is comparable in micro and macro accounts. The financial accounts are an important part of the macro presentation, whereas business accounts usually are focused on the Income statement and the Balance sheets. Because the *1993 SNA* does not define goods and services accounts for sectors, there is a vexing omission in not providing data on sales and purchases.

Although, as a rule, the macro systems do not net or consolidate data, there are significant exceptions. For instance, taxes on products are usually presented net of subsidies. Output is recorded net of normal losses, capital formation is normally presented as acquisitions less disposals, and inventories are only shown in the form of net changes. The financial account and other changes in assets accounts are also net in the *1993 SNA*, with "changes in assets" on the left side and "changes in liabilities" on the right side of the T-accounts. It is interesting to note that the *BPM5* uses the labels of debit and credit in this respect. This, however, is confusing because the data are net debits and net credits for financial instruments. It is not possible to determine whether the data imply net increases or decreases without further information on whether the entries refer to assets or liabilities. The adoption of the *1993 SNA* presentation conventions would be recommendable. Business accounts are very flexible in their netting procedures and may present assets net of liabilities, something which is never done in the macro accounts.

4.6. *Additional Accounting Rules*

It is important to realize that macroeconomic bookkeeping answers certain rules in addition to those of vertical and horizontal double-entry bookkeeping. For instance, sometimes the equality of the final expenditure and income approaches to GDP is ascribed to the application of double-entry book-

keeping.[13] However, the equality of the net production and the expenditure approaches rather follows from Say's law that the supply of commodities is equal to total demand for them. The equality of these approaches with the income approach is the result of a mathematical rule: if value added minus distributed income equals profits, then distributed income plus profits must equal value added.

The rules on calculating data at constant prices may also be regarded as an additional set that the macro system has adopted in addition to those of quadruple bookkeeping.

5. A Marriage between Micro and Macro Bookkeeping?

There would be significant advantages for having a close relationship between micro and macro bookkeeping.[14] Firstly, micro bookkeeping is the main basis for the macro accounts, and the possibilities of receiving reliable supplementary data that do not originate in micro bookkeeping are very limited. Secondly, and even more importantly, the macro systems should provide the data to make estimates on future developments. As these developments largely depend on how businesses and households perceive their economic situations, the macro datasets should reflect micro perceptions as closely as possible.[15]

One reason that may have impeded establishing a closer link between macro aggregates and micro concepts in the past is that there are limits to the detail macro systems can handle. However, this situation has changed with the improvements in computer capacity and communications. Nowadays, the management and analysis of very large micro-databases are feasible tasks. A more ponderous impediment, as previous sections have pointed out, is that micro data are often mutually inconsistent and that the macro systems purport to bring out certain economic realities that may not be apparent in micro data.

The pros and cons of a closer link between micro and macro accounting are the subject of the present section. Subsequently are discussed: (i) Nancy and Richard Ruggles' views on how macro systems should be changed to come closer to micro data, (ii) the proposals made by Harry Postner, which essentially say that macro data should be direct aggregations of micro accounting data preserving transactors' views but adjusted for differences in timing, classifications, or recording errors, and (iii) the possibilities of making the links between micro and macro

[13]For instance, Edward N. Wolff in his Foreword to Ruggles and Ruggles (1999) and the Richard Ruggles In Memoriam published in the September 2001 *Review of Income and Wealth*: "The development of national accounts was based on double-entry bookkeeping such that any product entry is matched with a corresponding income entry. The principal aim is to maintain consistency between product and income accounts. Thus, for example, the definition of gross domestic product (GDP) on the product side consists of five components: household consumption, investment, government expenditures, exports, and imports (treated as a negative entry). However, GDP can also be defined on the income side as the sum of three components: employee compensation, corporate gross profits and indirect business taxes."

[14]A more elaborate argumentation in favor of the integration of macro- and micro-level data can for instance be found in a report that Richard Ruggles prepared for the United Nations (United Nations Statistical Office, 1982, pp. 49–51).

[15]Although not discussed here, this is also true for government agencies; see, for instance Bloem (1987).

datasets more explicit without changing either the macro or micro accounting systems.

5.1. *The Views of Nancy and Richard Ruggles*

Nancy and Richard Ruggles, with their keen interest in issues related to the household sector, were lifelong advocates of better links between micro and macro statistics. Particularly in the process of the preparation of what has become the *1993 SNA*, they actively championed these ideas. Looking back on the *1993 SNA*, they have more or less achieved what reasonably could be done regarding the improvement of the micro-macro linkages.[16]

A main goal at which Nancy and Richard Ruggles strived, is keeping the macro system simple and close to the concepts individual agents use themselves. The reason is that the macro system should reflect the views of the economic agents, in particular those of households. This implies adoption of the transactor/transaction principle, and above all separating imputations and reroutings from market transactions in the macro system.

In the same vein, Nancy and Richard Ruggles strongly felt that data on nonprofit institutions serving households (NPISHs) should not be mixed with data for private households. While it is true that NPISHs produce goods and services that benefit households and in a sense supplement household expenditures on similar goods and services, they operate as independent agencies. Lumping NPISHs together with households in one sector therefore generates data, for instance on saving, that households do not recognize and do not act upon. Such an improperly calibrated accounting system gives the wrong signals to economic analysts. For similar reasons, the Ruggleses rejected the classification of individuals residing in institutions as part of the household sector.

Practical as they were, Nancy and Richard Ruggles supported the core-module approach when it was proposed. Proponents of this approach put forward that macro systems should consist of a simple multipurpose core system, supplemented by various modules to serve specialized types of analysis.[17]

The *1993 SNA* accommodates the concerns of Nancy and Richard Ruggles in various respects. Firstly, in a few instances the central system incorporates several points of view instead of giving a monolithic presentation. For example, both the views of "who pays" and "who benefits" are presented concerning social transfers in kind. Furthermore, the *1993 SNA* borrowed from the *European System of Accounts* that pension fund contributions and benefits can both be shown as income flows (such as households see them) and as financial transactions (in order to have consistent treatment with life insurance) if only a correction line was added in the Use of disposable income account. Secondly, the *1993 SNA* explicitly allows a large measure of flexibility. In particular the chapter on Social Accounting Matrices provides many suggestions to subclassify the household sector and introduces alternative presentations that support the analysis of private household economics. Thirdly, although it turned out not feasible to restrict the central part of

[16]This does not exclude that the Ruggles themselves still saw many possibilities for further improvement, as set out in Richard Ruggles (1996).

[17]See, for instance, van Bochove and van Tuinen (1986).

the macroeconomic accounting system to a very simple core, the *1993 SNA* Annex V.E provides a list of elements of complementary classifications for transactions and other flows. By making the distinction between monetary transactions and flows whose value is not directly observed, this list may be of help to those who are interested in isolating the sections that reflect the micro views of households.

Even if these go beyond the proposals made by Nancy and Richard Ruggles, examples can also be given of how other macro systems have tried to come closer to micro views. For instance, *MFSM* paragraph 213 states that most components of liabilities in the form of shares and other equity should be valued at book value for the monetary statistics. Similarly, the *BPM5* allows recording loans sold at discount asymmetrically by creditors and debtors. *BPM5* paragraph 471 states that, while claims on the creditor side are valued on the basis of transaction price, on the debtor side, the amount the debtor is contractually obliged to repay creditors is used as a basis for valuation. The *External Debt Statistics: Guide for Compilers and Users* (Final Draft 2001, paragraph 47) recommends that debt instruments be valued at the reference date at nominal value, and, for traded instruments, at market value as well. It further mentions that the nominal value of a debt instrument is a measure of value from the viewpoint of the debtor because that is the amount that the debtor owes to the creditor at any moment in time. In all these cases, the statistics are drawn up for a group of units rather than for all units, which makes an exception possible on the *1993 SNA* rule of identical valuation for both debtors and creditors.

5.2. *Harry Postner's Proposals*

Where Nancy and Richard Ruggles advocated adaptations in the macro accounting systems to better reflect micro views, Harry Postner has a much more radical approach. He proposes that the macro systems be directly built up from micro accounts preserving the integrity of decision-making accounting records. Postner's study is limited to business accounts and acknowledges that quadruple inconsistencies arising from differences in timing, differences in classification, or recording errors should be removed.

In a series of well-documented analyses (Postner, 1986, 1988, 1992), Postner investigates the measurement problems that arise when macroeconomic accounts for the enterprise sector would be put on a microdata foundation. Crediting Thomas Shelling for identifying the issue, Postner develops the characteristics of the main source of difficulty, namely, differences in the views transactors may have on their mutual transactions. For instance, one enterprise may think that it is involved in an operational lease whereas its counterpart sees the same contract as a financial lease. Such differences of view cannot be accommodated in a system applying horizontal double-entry bookkeeping because the rules of consistency require that a choice be made between either operational lease or financial lease, and that this choice be reflected in the accounts of both enterprises.

Postner then questions whether the uniformity imposed by horizontal double-entry bookkeeping is a useful convention. He comes to the conclusion that it is preferable that macro accounting systems record transactions such as each individual enterprise sees them, provided that the discrepancies between individual

views are not all-pervasive and appropriately tracked. The advantage of this approach is that behavioral relationships are better described: national accounts would move to "prospective accounting." A consequence of the new approach is that national totals such as GDP are no longer uniquely defined, but this would be an acceptable inconvenience. The method requires that statisticians obtain the data on which enterprises make their actual decisions, which admittedly may not be easy. Postner appears to accept that the micro business data are rearranged and reclassified for conceptual reasons, but this aspect is not further worked out. He suggests that at an aggregate level the discrepancies between perceptions of enterprises on their mutual transactions have a tendency to be reversed in future accounting periods.

Postner's ideas have much merit, because aggregated micro information would indeed generate valuable opportunities for studies on economic behavior. However, being original, the proposals are also open to criticism. A main disadvantage is the loss of uniquely defined totals such as GDP. Furthermore, by recording micro views, the macro systems would stop showing the "underlying economic realities," which used to be among their major functions. One of the consequences is that making comparisons over time and space may become problematic. There are also practical issues. Would it indeed be possible to obtain the accounting records on which enterprises make their decisions? Business accounts that are published or otherwise available to statisticians do not necessarily reflect the enterprises' genuine views, because they may be influenced by accounting standards, taxation and other administrative rules, as well as manipulation by the enterprises themselves.[18] And what about the views of the important household sector? Households do not usually keep accounts, and for what we know their views change quite frequently. Given the sheer number of potential conflicts of opinion on valuation, timing, and classification at the micro level, would the macro systems still be manageable and understandable to users? Is it really true that the consequences of differences in opinion tend to cancel out over time? The example of operational versus financial leasing would not suggest so. For all these reasons, it might be advisable to have the aggregation of micro perspectives as supplementary information to the traditional macro accounts, rather than their replacement. As such they will certainly enrich economic analysis.

5.3. *Making the Micro-Macro Links Explicit*

While Nancy and Richard Ruggles add sectoral detail and restrict the number of imputations in the macro accounts, and Harry Postner builds up new macro accounts that do not answer any longer the rules of horizontal consistency, there is a third road. This leaves the macro and micro accounts as they are, but provides information on the links between the two systems.

To be realistic, it would be impossible to establish such links up until the level of individual units. The national accounts and other macroeconomic systems often use statistical sources and introduce adjustments that cannot be specified by individual transactor. It is advisable, therefore, to have an intermediate level of small

[18]For instance, it is not in the interest of any enterprise to provide details on tax evasion.

groupings below which the information on the micro-macro links are not further individualized. France has wide experience with the construction of intermediate systems, and has extensively published on this.[19]

It would appear that the number of corrections that macro systems make on micro accounting data is quite considerable, even in a country such as France that starts out from already highly standardized data collected through tax returns and enterprise surveys. For certain categories, such as changes in inventories and consumption of fixed capital it is even considered hardly worthwhile to undertake the linking exercise. Going from micro data to the intermediate system, in France adjustments are made, among other things, for discrepancies with tax data from fiscal sources. Uniformity is imposed on issues where enterprise practices may differ, such as the recording of subsidies, research and development, own-account capital formation, and also pricing systems. Reclassifications are made as well, such as excises on oil that are recoded from purchases to taxes on products. Examples of standard steps between the intermediate system and the macro accounts include reclassifications related to wages and salaries in kind, discounts, transfers to NPISHs, engineering costs, rents on land, financial leasing, insurance transactions, and adjustments for moonlighting.

The usefulness of the linking exercise may depend, as Harry Postner probably would underline, on how representative the basic data are for the information that enterprises themselves use in making business decisions. In the United States, for instance, an intermediate system probably would have limited analytical value because business reports are little used by the national accountants for the lack of product detail and their late availability.[20] However, presenting where possible the micro-macro links explicitly would certainly enhance the analytical value of the macro information.

6. Conclusions and a Look Ahead

The discussion in the previous sections has left us with a difficult problem. While there is general recognition that it would be good to have a strong link between macro and micro accounting data, the question should be asked: which micro accounting data? Households do not normally keep books and business may produce different accounts for different purposes. Harry Postner should be credited for underscoring that the micro data one really wants to link to are those on which households and businesses take their economic decisions. However, this insight does not help us much in practice, because there is no way to know which data these exactly are. One can only *presume* that households do not take imputations into consideration when making economic decisions, but on the other hand it must be true that an owner-occupier feels better off than in a situation that he or she would not own the dwelling. So maybe households take the imputed services of their homes into account after all! For private business one may presume that the accounts used for tax purposes or the accounts that reflect generally

[19]For instance, Vanoli (2002) contains a section on the intermediate system, and Augeraud and Chapron (2000) discuss this system in detail.

[20]Parker (2000, p. 123).

accepted accounting principles are close to their own perceptions. Yet, this still leaves us with a wide range of options, for instance regarding valuation or the treatment of depreciation.

Now that the preparations have begun for the revision of the *1993 SNA*, which should be our recommendations regarding its bookkeeping conventions and the micro-macro link? We offer four.

- First, we would recommend that the central framework for the national accounts and other macroeconomic statistics should continue to be based on quadruple-entry bookkeeping. There is no other way of coming to acceptable totals such as GDP. The use of standard conventions on valuation, timing, and classifications implicit in the application of quadruple-entry bookkeeping makes it possible to make comparisons between the economic situations of groups of units and to analyze their evolution over time.
- Second, the publication of the numerical link between enterprise accounts and the macroeconomic enterprise data would be very useful for economic analysis. The construction of intermediate accounts may also lead to improvements in the macro estimates.
- Third, it would be advisable to continue the implementation of Nancy and Richard Ruggles' proposals, that is, to make imputations more explicit in macro data systems. Probably this is best done in supporting tables in order to keep the central systems manageable.
- Fourth, the central systems should be extended to include more concepts that are essential to micro accounting. For instance, it is highly recommendable that the national accounts present data on sales and purchases. The macro systems should define additional balancing items that consist of combinations of transactions and other flows (specifically income plus revaluation items) if these conform to generally accepted concepts in micro accounting.

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