

Civil Law, Quadruple Entry System
and the Presentation Format of
National Accounts

Kazusuke Tsujimura Masako Tsujimura

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Abstract

One of the advantages of Roman law is simplicity. The quadruple entry system based on it gives a rigorous accounting framework to the system of national accounts when it is combined with historical cost accounting. Such a system retains all the desirable features of modern accounting: intra-sector, inter-sector and intertemporal consistency. The remarkable peculiarity of the system of national accounts is that it is the only statistics that depicts the interrelations between financial and real economy. The proposed scheme of this paper presents flows and stocks in an integrated framework, which makes it possible to clarify the relationship between savings and wealth and, therefore the relationship between income and wealth. This will enhance understanding of the interactivity between financial and real phenomena such as financial bubbles, crashes and depressions well within the domain of the system.

Key Words

System of national accounts; Historical cost accounting;
Concept of income; Capital gain/loss

JEL Classification Numbers

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1. Introduction

The system of social accounting¹ inclusive of the system of national accounts (SNA) has developed based on various fields of studies including economics, law and accounting. From the viewpoint of jurisprudence, the social accounting system stems from the civil code of Roman law, especially the *Corpus Juris Civilis* of Emperor Justinian². Since modern accounting system initiated by Fra Luca Pacioli³ is closely associated with the civil code, there is no major discrepancy between the two origins⁴. Indeed, to this date, majority of the countries of the world including not only those in continental Europe and South America but also Japan, China, Russia and South Africa, among many others, have civil code systems based on Roman law. Even in the countries of common law, Roman law has considerable influence. The civil code of Roman law or the civil law for short tries to classify the social phenomena into as few categories as possible and to give no more than basic principles. This process of abstraction is important not merely for the simplicity of formulation which it makes possible, but also because principles, unlike rules, are fertile; by combining two or more principles, it is possible to create new principles that can apply to new phenomena, which are not known when the legislation has been put into practice⁵.

In relation to the system of social accounting, *jus in rem* has the maximum relevance. The problem is that this word has no exact equivalent in English. In this case, *in rem* means actions against *res*, which could be either *res corporalis* (i.e. physical thing) or *res incorporalis* (i.e. abstract thing). Since *jus* means law in some context, in such case *jus in rem* is translated as law of physical and abstract things⁶. The common factor between physical and abstract things however, is that both are assets of economic value⁷. It is that part of law which governs the creation, transfer, and utilization of economic assets --- of property in the widest sense⁸. To use the language of rights, the

¹ Social accounting is a system of accounts that involves more than one economic unit. In the terminology of Hicks (1942), the social accounting is the national accounts disaggregated by main economic sectors so that it would depict the relation between them. *Ibid.*, pp.192-195.

² Also known as *Justiniani Institutiones* or *Codex Justinianus*. Translated into English in Thomas (1975) etc.

³ Pacioli did not invent the system, but codified the accounting practices widely used during the Italian Renaissance.

⁴ See footnote 12 below.

⁵ Nicholas (1962), p.1.

⁶ Hohfeld (1917) describes *jus in rem* as “somewhat obscure and ambiguous” words. For further details of Latin usage, see Holland (1896), pp.121-122, and Warmelo (1959).

⁷ The broad concept of *res* as any economic asset was, however, a matter of historical development toward *Justiniani Institutiones* for it is clear that original *res* of Roman law was the *res corporalis* rather than *res incorporalis*. See Thomas (1975), pp.73-74.

⁸ Nicholas (1962), p.98.

law of things includes all those rights which are capable of being evaluated in money terms, so that on many occasions French words *droits économiques* are considered to be more appropriate as a translation of *jus in rem*. As this expression was not directly translatable into English, the authors of the 1993 SNA manual, following the footpath of 1968 version, used the term *economic value* as equivalent⁹. Although the manual does not clearly define what the system of national accounts is, it repeatedly suggests that it records the *economic value* when it is created, transformed, exchanged, transferred or extinguished¹⁰.

According to Roman law, the division is a threefold one, into *jus proprietatis* (the law of property or things in a narrow sense), *jus obligationis* (the law of obligations), and *jus successionis* (the law of succession). Property and obligations are two types of assets, whereas succession is not a third type but a method of acquiring the other two¹¹, thus beyond the scope of the present paper. The primary object of modern accounting is no other than the recording of assets (and corresponding liabilities if applicable) in the sense mentioned above¹². It should be noted that any type of obligation necessarily involves two parties called creditor and debtor. Social accounting is an attempt to record both assets and liabilities taking this duality into consideration, thus property right plays a low-key role in that respect. The quadruple entry system¹³, in which both vertical and horizontal double entry prevail as detailed in the next section, is an indispensable tool in this regard¹⁴. As a consequence, there is a debate on to what extent the social accounting should deal with. Apparently the advantage of social accounting lies in the simultaneous recording of assets and liabilities in the light of the dual nature. In that sense, only claims and obligations should be registered. The money-flows account, one of the predecessors of present formulation of SNA, sticks to this idea¹⁵. However, it is hard to leave the property rights in the narrow sense out of the scope, when we consider the

⁹ Vanoli (2002), p.197, encadré 25. For English translation, see Vanoli (2005), p.154, box 25.

¹⁰ United Nations *et al.* (1993), par. 2.64 and 3.3 for example. [United Nations Statistical Commission (2008), par. 2.21 and 2.55.]

¹¹ Nicholas (1962), p.98.

¹² Pacioli recommended recording not only the property rights but also the obligations of any kinds. See Pacioli (1494), chapters IX and XVI-XXI.

¹³ The terminology is attributed to Copeland (1949). The earliest attempts to introduce the quadruple entry system into national accounting include, but are not limited to, van Cleeff (1941), Gruenbaum (1941) and Meade and Stone (1941). An example of full-fledged use of the system is Copeland (1947). See den Bakker (1994), Kurabayashi (1994) and Postner (1994) for further details.

¹⁴ Although Pacioli did not directly mention the quadruple entry system, the name of creditors and debtors were essential part of his double entry system. He also proposed to sort the accounts by the names of creditors and debtors. See Pacioli (1494), chapters XI and XIII.

¹⁵ Copeland (1947, 1952). As an institutional economist, Copeland was well aware of the relations between the law and the accounting system. See Rutherford (2002) for details.

importance of economic activity such as production or exchange.

The present paper is an attempt to reexamine 1993 SNA on the basis of the civil law and the quadruple entry system, which is the backbone of the entire system¹⁶. In Section 2, we will discuss some basic topics of social accounting. The foundation of the quadruple entry system is examined in detail in 2.1. Then in 2.2, we will investigate the time of recording in relation to the type of obligations. The valuation of assets will be discussed in 2.3 by comparison of historical cost accounting with current value accounting. In Section 3, we will try to modify the presentation format of 1993 SNA to accommodate the argument raised in Section 2. The presentation format of 1993 SNA will be reviewed in 3.1 from the viewpoints of intra-sector, inter-sector and intertemporal consistency. We propose an alternative presentation format of national accounting in 3.2. The first proposition is about the production accounts, which is obtainable by rearrangement of supply and use tables. The second proposition is about the capital and financial accounts. We suggest creating a new account to deal with the secondary market asset transactions so that the capital gain/loss generated in the process is explicitly recorded. These topics will be examined in turn in 3.2.1 and 3.2.2 while some examples will be presented in 3.3. Since the problem of capital gain is closely related to the concept of income, we will look into the matter from the historical perspective in 4.1. It will be disclosed in 4.2 that the alternative concepts of income, namely concept of income as consumption, as produce and as earnings, are equally accommodated in the revised format of national accounts proposed in the previous section. Some concluding remarks will be made in the final section.

2. Basic Principles of Social Accounting System

2.1 Quadruple Entry System

As mentioned in the previous section, one of the primary objects of social accounting is to depict the relations between economic units in terms of rights and obligations (assets and liabilities) by observing the fact that there is a duality between them. The best device in this regard is the horizontal double entry: the simultaneous entry of an obligation and corresponding claim to the balance statements of the two parties concerned. For example, in a loan transaction, an acquisition of asset will be recorded in the balance statement of the lender, while same amount of incurrence of

¹⁶ United Nations *et al.* (1993) clearly states that 1993 SNA is based on a principle of quadruple entry (par.2.60), however it also notes that the principle does not imply that the relations between sectors are directly shown in the accounts (par.2.61-2.62). [United Nations Statistical Commission (2008), par.2.52-2.53.]

liability will be registered in the statement of the borrower. If the loan is made in the form of bank transfer, there will be simultaneous recording of increase in the loan and the decrease in the deposit on the creditor side. In this case, there will also be simultaneous recording of increase in deposit and of incurrence of debt on the debtor side. They are known as vertical double entry. That makes four simultaneous entries for one transaction; thus it is called quadruple entry system. As long as we follow this principle, there will be balance between assets and liabilities within the statement of an economic unit. At the same time, the quadruple entry system ensures the balance between assets and liabilities for each item appearing in the balance statements. Thus it is easy to verify the numerical consistency of accounting records. This is one of the indispensable features of the quadruple entry system.

In the social accounting, there are two kinds of balance statements for each economic unit. The first statement records the balance of assets and liabilities; it is the stock account¹⁷ (or capital account in broad sense) corresponding to the asset and liability statement (balance sheet) in corporate accounting. Another statement is the flow account¹⁸ (or current account in broad sense), which is an equivalent of the profit and loss statement in business accounting. Both flow and stock accounts consist of two columns for resource and use. The double entry takes either of the following form (vertical double entry): (1) simultaneous recording of same amount of increments in resource and use, (2) simultaneous recording of same amount of reductions in resource and use, (3) simultaneous recording of same amount of increment and reduction in resource, (4) simultaneous recording of same amount of increment and reduction in use. These rules apply both to flow and (accumulation of) stock accounts, so that the total amount of resource is equal to that of use of the economic unit at any moment.

In addition to the above, the quadruple entry takes either of the following form (horizontal double entry): (i) simultaneous recording of same amount of increment in the resource of the first party and in the use of the second party, (ii) simultaneous recording of same amount of reduction in the resource of the first party and in the use of the second party, (iii) simultaneous recording of an increment in the resource of the first party and same amount of reduction in that of the second party, (iv) simultaneous recording of an increment in the use of the first party and same amount of reduction in that of the second party. As long as these rules are strictly observed, for each item, the total amount of resource is equal to that of use in the consolidated statement, in which

¹⁷ The term is attributed to Ruggles (1987).

¹⁸ See footnote above.

all the accounts of the concerning parties are combined¹⁹.

The inclusion of property rights in the balance statements brings a devastating problem in the verification of numerical consistency. What will happen if you collect fruits from the trees in your garden²⁰? Roman law stipulates that ownership is obtainable by taking possessions of things which have no owner. This means an acquisition of asset but there is no corresponding liability in any kind. So, if you record the addition of the assets, it should be a unilateral entry rather than a bilateral one. This does not conform to the quadruple entry system, but this does not comply with the double entry system either. The easiest remedy is that to record the activity as if the products were put on the market; that is to record the collection of fruits not only as inventory increase but also as production of the fruits. This will bring balance within the flow accounts all right, but will still result in an imbalance between assets and liabilities so that it is common to introduce some balancing item called net worth²¹, as in the case of 1993 SNA, to cope with the problem. The introduction of balancing item is fatal because the numerical consistency on surface does not warrant the accuracy of the accounting any longer; however the net worth has at most importance as an accumulation of assets from the perspective of economics so that we cannot afford to ignore it. The important thing is that the duality between obligations and claims are still intact and the quadruple entry system is a necessary tool to ensure the internal consistency between them.

2.2 Time of Recording

One of the advantages of the civil law is simplification. In this regard, Roman law classifies the contracts into several categories. While some type of obligation arises from an agreement alone, other type of obligation does not arise until the object is actually delivered. The former is called consensual contract, while the latter is called real contract. Another categorization is concerning to the number of obligors. In case only one party of a contract is an obligor, it is called unilateral agreement. If both of the parties concerned are obligors, it is called bilateral contract.

For example, in the civil law, a sale transaction is designated to be a consensual contract rather than to be a real contract. It is also a bilateral contract. In this case, the execution of the contract can be divided into three phases: (a) the conclusion of the

¹⁹ For further discussion of the quadruple entry system, see Gorter and Shrestha (2004).

²⁰ In the context of SNA, this example is closely related to the production boundary problem. See United Nations *et al.* (1993), par.1.23. [United Nations Statistical Commission (2008), par.1.43-1.44.]

²¹ Net worth is often referred to as equity in American English.

contract; (b) the performance of the contract by the vendor (the delivery of object); (c) the performance of the contract by the vendee (the payment). As a consequence, there are three alternative time of recording. If you choose (a) as the time of recording, it is called accrual basis. Alternatively, you can choose (b); in that case, it is called realization basis. The other option is (c); it is called cash basis. However, sometimes the vendee fails to make payment on due date so that an alternative is to choose (d) the due date as the time of recording; it is called due-for-payment basis.

Another complication is that there are two pairs of creditors and obligors in this case because it is a bilateral contract. The first party of the sale contract is obliged to deliver the object (products or services) while the counterparty is entitled to receive it. At the same time, the second party of the contract is obliged to make payment while the counterparty is entitled to collect it. If we consider that the primary object of the social accounting is the listing of the existing obligations (i.e. unperformed contracts), the time of recording should be (a) with no room for doubt. Also it looks obvious that both pairs of obligations (and associated credits) should be recorded simultaneously. The vendor's obligation should be eliminated from the book at the time of (b), while that of the vendee should be erased at the time of (c).

The problem is that the system of national accounts is a record of transactions rather than a list of existing obligations. In that perspective, we should avoid the double counting, so that either side of the obligations should be recorded²². In the case of 1993 SNA, only the vendee's obligation is recorded; that means only the payment part of the transaction is put on record. Another problem is that we must choose only one time of recording from the three alternatives. In this regard, 1993 SNA chooses (b); the point of delivery of the object. 1993 SNA refers to it as accrual basis instead of realization basis²³. Since it is commonplace that the terms of a sale agreement are revised accordingly at the time of delivery, this appellation is also widely used. As a consequence, the payment is recorded at the time of delivery rather than at the time of payment; it certainly is a queer mix-up.

2.3 Valuation of Assets

While the problems associated with the duality nature of obligations and the time of recording are closely related to the notions of civil law, the problem of asset valuation has close connection to the economic thoughts as well. The basic principle of modern

²² Aukrust (1949) claims that an ideal national book-keeping system should be constructed so as to give information on both real flows and financial flows, and on their mutual interdependence.

²³ United Nations *et al.* (1993), par.3.94. [United Nations Statistical Commission (2008), par.3.16 and 3.163.]

accounting is that the assets are recorded at acquisition value; it means no revision shall be made to the original quadruple entry. As long as you follow this principle, the total amount of resource is equal to that of use of an economic unit at any moment. Furthermore, for each item, the total amount of resource is equal to that of use in the consolidated statement. In business accounting, the method is usually referred as historical cost accounting²⁴. The problem arises when the assets are sold to another party because the transfer price could be different from the book value of the previous possessor. One of the possible solutions is to record the sale of the asset at the historical cost of the previous possessor and to record the difference between the transfer value and the book value as a current transfer from the new possessor to the previous one. In this case, the acquisition value of the new possessor should include the value of such current transfer.

The advantage of the historical cost accounting is the intertemporal consistency. The sum of the opening balance sheet and the accumulation accounts (after depreciation) of the period makes the closing balance sheet. This is another criterion for modern accounting. While the vertical double entry guarantees the numerical consistency of the balance statement of an economic unit and the horizontal double entry secures the equilibrium between economic units, the historical cost accounting assures the intertemporal consistency of the accounting. However, the 1993 SNA clearly stipulates that assets and liabilities are valued at current prices²⁵ rather than at original prices (historical costs)²⁶ so that, in addition to the accumulation accounts, the revaluation account, which is a part of other changes in assets account, is introduced to bridge the gap between the opening and closing balance sheets. While the accumulation accounts are directly linked to the allocation of income accounts through a balancing item called saving, the revaluation account has no logical connection to the flow accounts. In that sense, the intertemporal consistency is no longer maintained. Since the current value accounting means to rewrite the book value (on the historical cost basis), the desirable features of the quadruple entry system mentioned above is not retained either.

Indeed, in corporate accounting, paragraph 101 of the IASB Framework²⁷ recognizes historical cost (the amount of cash or cash equivalent paid) as the basis for

²⁴ McKeown (1997).

²⁵ Synonymous for the market price in this context. United Nations *et al.* (1993), par. 2.68. [United Nations Statistical Commission (2008), par.2.59.]

²⁶ United Nations *et al.* (1993), par. 2.69. [United Nations Statistical Commission (2008), par.2.60.]

²⁷ Framework for the Preparation and Presentation of Financial Statements was adopted by the International Accounting Standards Board in April 2001.

the financial statements. Although paragraphs 43 through 49 of International Accounting Standard 39 stipulate that the financial assets as well as financial liabilities held for trading²⁸ should be measured at fair value (i.e. current market value), it applies only to this class of assets. The problem is that current value accounting draws unrealized as well as realized holding gains/losses within the scope of income recognition for public disclosure²⁹; it is considered to be misleading. If we extend this analogy to national accounting, the key question is whether it is meaningful to introduce current value accounting to the system without reassessing the underlying concept of income itself. This reminds us that there was a long controversy over the concept of income before it was abruptly settled (at least on surface) by the publication of Keynes' *General Theory* (1936). In fact, Keynes was in favor of another definition of income, which took capital gain/loss into account, when he published the *Treatise on Money* (1930) only few years earlier. We will investigate the matter thoroughly in Section 4 below.

3. Presentation Format of SNA

3.1 1993 SNA Classified by Institutional Sectors

As we have seen in the previous section, the quadruple entry system and the historical cost accounting are the essential parts of the social accounting to guarantee the intra-sector consistency, the inter-sector consistency and the intertemporal consistency³⁰. In this section, we will examine the presentation format of 1993 SNA from those points of view. Table 1 is the typical presentation format of 1993 SNA, classified by the institutional sectors, in line with the manual provided by the United Nations *et al.* The figures shown in the table are those of Japan in 2004. Since the rest of the world (ROW) is not one of the institutional sectors in the framework of the SNA, the figures are obtained from the rest of the world accounts and the closing stocks of external assets/liabilities tables and arranged accordingly. There are balance statements of six institutional sectors, if we take ROW as one of them. Each balance statement is consist of two rows corresponding to assets/uses and liabilities/resources respectively.

The balance statement of each institutional sector is divided into five folds: the opening balance sheet, the allocation of income account, the accumulation account, the

²⁸ Not held to maturity.

²⁹ See Joice and Wright (2001) for further discussion.

³⁰ Money-flow accounts of Copeland (1947, 1952) are good examples of national accounting system that satisfies all the criteria mentioned here. See Shishido (1956) for details. The influence of Copeland on SNA is discussed in Kenessey (1994b, c) as well as in Postner (1994).

other changes in assets account, and the closing balance sheet. The allocation of income account is divided into three sub-accounts: the allocation of primary income account, the secondary distribution of income account, and the use of disposable income account. Likewise, the accumulation account consists of two sub-accounts: the capital account and the financial account. The opening balance sheet and the closing balance sheet are stock accounts while the allocation of income accounts and the accumulation accounts are flow accounts. The other changes in assets accounts record the changes in assets, liabilities, and net worth between opening and closing balance sheets that are not attributed to transactions between institutional sectors, as recorded in the accumulation accounts. The account is divided into two sub-accounts: the other changes in volume of assets account and the revaluation account.

Since 1993 SNA abides by current prices in the asset valuation, the figures on the closing balance sheet are not obtainable by simply summing up the corresponding figures of the opening balance sheet and the accumulation accounts as in the case of historical cost accounting. As a consequence, the revaluation account counts most of the other changes in assets account. In that sense, 1993 SNA fails to present flows and stocks in an integrated framework, which is supposed to make it possible to clarify the relationship between saving and wealth. The holding gain³¹ is up in the air; 1993 SNA does not tell where it comes from or where it goes. It is true that the current value accounting show the holding gain yet to be realized so that we can infer the wealth effects in that respect; however it does not exhibit what portion of the holding gain has been realized, which must have more importance in the decision making and its consequences³². An illusion must have some effects but not as much as a reality does.

The sum of assets/uses of a particular account is equal to the corresponding sum of liabilities/resources. The balancing items play an imminent role in this regard. For example, net worth in the balance sheets is defined as the value of all the non-financial and financial assets owned by an institutional sector less the value of all its outstanding liabilities. In that sense, the equivalence between assets/uses and liabilities/resources is superficial. However, in the flow accounts of 1993 SNA, the balancing items play an indispensable role to combine one account with another; i.e. a balancing item is carried from one account to the next. For example, the balance of primary incomes, which is the

³¹ 1993 SNA uses the terminology *holding gain* instead of *capital gain* because it includes unrealized gain. United Nations *et al.* (1993), par.3.62. [United Nations Statistical Commission (2008), par.3.105.]

³² Not a few authors have addressed this problem from the perspective of the definition of income. One of the earliest literatures is Lindahl (1919). For further details see Vanoli (2002), pp.418-419, pp.458-464 (Vanoli (2005), pp.329-333, pp.364-370) in addition to Section 4 of this paper.

balancing item of the allocation of primary income account, is carried to the secondary distribution of income account. When the disposable income, another balancing item, is calculated, the balance of primary incomes is treated as if it is one of the resource items of the secondary distribution of income account. In that sense, the flow accounts are sequential in the order of appearance.

Each figure in the rightmost column of the table is the total of the row: the sum of the assets/uses of all the institutional sectors less the corresponding sum of the liabilities/resources. As for the stock accounts, the financial assets and the liabilities are balanced *a priori* because both items are recorded at market prices in the framework of 1993 SNA. In the flow accounts, some figures of the row sum are zero indicating that the total assets/uses and the total liabilities/resources of the item are balanced; the row is self-contained in the view of the quadruple entry system. Some other rows including those of the balancing items, the net acquisition of financial assets and the net incurrence of liabilities are balanced as a pair. However some other rows have no counterparts elsewhere indicating that the quadruple entry system is not working in the presentation format of the 1993 SNA as a whole³³. Moreover, the net lending / net borrowing, which is supposed to be a balancing item, is not in balance as a pair because of the discrepancy in the estimation process³⁴, so that the double entry system is not properly working either.

3.2 Revision to the Presentation Format

3.2.1 Production Accounts and Treatment of Taxes

Table 2 is one of the examples of the revised presentation format of the system of national accounts. In this table, each row and column has an identification code so that each cell is recognizable by the combination of the codes. A column is identified by a capital letter while a row is distinguished by a combination of a small letter and a number; the small letter is assigned to a particular account while the number identifies a row included in the account. All the rows appearing in the flow accounts are either balanced unilaterally or in pairs so that the quadruple entry system holds as a whole. In the former case, the column at the far right is indicated as “balanced” while the corresponding row is given in code in the latter case. The balancing items are marked with squares and the sequential relations between the cells are shown by arrows. The historical cost accounting is presupposed so that the figures on the closing balance sheet are obtained by summing up the corresponding figures of the opening balance sheet, the

³³ See footnote 16 above.

³⁴ For further details see section 3.2.2 and footnote 40 below.

accumulation accounts, and the other changes in volume of assets account. In this scheme, as detailed in the next sub-section, the realized capital gain is referred as current transfers associated with secondary market asset transactions. The revaluation account, which is a part of the other changes in assets account in the 1993 SNA, is removed to outside the sequence of the historical cost accounting. Now it is renamed as unrealized holding gain/loss account and bridges between the closing balance sheets at the historical cost and at the current value.

One of the major differences between Table 1 and Table 2 is the addition of the production accounts. Actually the production account exists in 1993 SNA; however it is consolidated rather than classified by institutional sectors so that it has no relevance to the quadruple entry system as far as the presentation format is concerned. Since production account is an equivalent of profit and loss account in business accounting, it is an indispensable part of the financial statement. Nevertheless the production account is omitted from sector-classified 1993 SNA because the supply and use tables provide an accounting framework within which the commodity flow method (product flow method) of compiling national accounts is systematically exploited³⁵. In the supply and use tables, the total supplies and uses of individual types of goods and services are balanced with each other. It does guarantee the numerical consistency of the data all right; however it is not conformable to the quadruple entry system which is based on the balances between the institutional sectors. Since the production of goods and services is an indispensable part of a system of national accounts, it is hard to deny the superiority of the commodity flow method as an estimation procedure. The problem is that the supply and use tables guarantee the internal consistency only in this particular part of the entire system of national accounts while the quadruple entry system does cover all the accounts of the system.

The supply and use tables could be converted into balance statements if the supplier and the user of the goods and services are identified. In the 1993 SNA, there is only handful of institutional sectors so that it must not be too difficult to reallocate the goods and services among institutional sectors. In fact, in the grand design of 1993 SNA, the cross classification of production items and institutional sectors is included³⁶. In Table 2 the supply and use tables are replaced by production accounts, which consist of three sub-accounts. The goods and services account records the allocation of output among expenditure items. The balance of input and output of intermediate goods

³⁵ United Nations *et al.* (1993), par. 1.16. [United Nations Statistical Commission (2008), par.1.24 and 14.2.]

³⁶ United Nations *et al.* (1993), Table 15.3.

alongside imports and exports are also depicted in this table. Although input and output of the intermediate goods and services are balanced as a whole, this does not apply to each institutional sector. The cross-section sum of the balancing items of the goods and services account, i.e. value added at market prices, is gross domestic products (GDP). Since 1993 SNA is dominantly based on the commodity flow accounting method, the estimation procedure of GDP is solely depending on the supply and use tables based on economic activity classification; thus goods and services account is deliberately omitted from the system classified by institutional sectors³⁷.

The second sub-account of the production accounts is taxes on production and imports account. The value-added type tax is subtracted and subsidies are added to the value added at market prices so that we obtain the value added at factor costs in line with the suggestions of Mead and Stone (1941). Some minor changes are also made on the resource side in this regard. All the tax revenue of the government inclusive of current taxes on income, wealth, etc. is recorded in the allocation of primary income account, while subsidies on production is relocated to the secondary distribution of income account. The idea is that tax revenue is the primary income of the government regardless of the taxation system of a country. In contrast to this, subsidies are considered to be reallocation of income rather than the primary function of the government.

The value added created in the process of production generates income, which is distributed among production factors in the generation of income account, another sub-account of the production accounts. The balance of production and outlay is a balancing item that is carried from the production accounts to the allocation of income accounts. Although this balancing item is described as operating surplus in 1993 SNA, we have decided to give more or less neutral name because this will appear in any institutional sector regardless of its nature. The trade balance, i.e. the difference between exports and imports, is carried directly from the goods and services account to the allocation of income accounts in this scheme.

3.2.2 Discrepancy between Capital and Financial Accounts

As we have mentioned earlier, a balancing item is carried from one flow account to another. In that sense, a balancing item should be exactly identical in the two accounts. The problem is net lending / net borrowing, which appear both in the capital

³⁷ United Nations *et al.* (1993), par. 1.16, 2.172-174. [United Nations Statistical Commission (2008), par.1.24, 2.136-2.138.]

account and the financial account of the accumulation accounts. This balancing item is known as the balance of saving and investment in the capital account, but also known as the financial surplus or deficit in the financial account. The identity between the balancing items of the two accumulation accounts is an indispensable feature of the set of accounts as a whole. This feature stems mainly from the fact that monetary transactions require simultaneous entries in the financial accounts of the two units concerned and in one or other of their current and capital accounts, the basic rule of the quadruple entry system. The conceptual identity between the balancing items provides a check on the numerical consistency of the set of accounts as a whole; however the two balancing items diverge significantly in practice³⁸ as in Table 1.

The fundamental reason why the discrepancy occurs in this particular part of 1993 SNA is deeply related to the estimation procedure of the statistics. As we have mentioned earlier, the estimation of the production accounts is heavily depending on the commodity flow method. Balance of production and outlay, a balancing item, is carried from the production accounts to the allocation of income accounts; then saving, another balancing item, is carried from the allocation of income accounts to the capital account. Saving less net capital formation and changes in inventories is no other than the balance of saving and investment. On the other hand, the financial surplus or deficit, the corresponding balancing item of the financial account, is calculated as the difference between net acquisition of financial assets and net incurrence of liabilities, which are customarily obtained from the flow of funds accounts.

In most cases, the figure in each cell of the flow of funds accounts is obtained as the difference between the corresponding cells of the opening and closing balance sheets, and the portion attributed to revaluation and other changes in volume are deducted afterwards³⁹. The problem is that we cannot distinguish newly implemented financial contracts such as new issues of securities from the secondary market transactions of the existing instruments. After all, as Wicksell (1898) has pointed out as early as in the nineteenth century, the peculiarity of modern economy lies in the fact that capital goods are not only borrowed and lent but also bought and sold⁴⁰.

To avoid the confusion of these two kinds of transactions, only new contracts shall

³⁸ United Nations *et al.* (1993), par. 10.31. [United Nations Statistical Commission (2008), par.10.29.] See Lequiller and Blades (2006) for details.

³⁹ The estimation procedure of the present-day flow-of-funds accounts is completely different from that of Morris Copeland's money-flow accounts, which is supposed to be the direct predecessor. See Taylor (1991) for details.

⁴⁰ Wicksell (1898), p.125, as translated by Richard Kahn, p.135. Wicksell designated that this was the fundamental reason that caused the division of natural and contractual rates of interest. For further discussions, see Vanoli (2002), pp.197-198, encadré 25 or Vanoli (2005), p.154, box 25.

be recorded in the primary market financial transaction account of Table 2. We propose that the transactions of existing financial instruments should be recorded in the newly introduced secondary market asset transaction account alongside with the sale of non-produced assets. It should also be reminded that Table 2 is based on historical cost rather than on current value. The secondary market transactions shall be recorded at acquisition value of the previous owner rather than at the current value (at which the asset has changed hands). The difference between the current value and the acquisition value is the capital gain/loss of the previous owner; it is recorded as a current transfer from the new owner to the previous one, though it must be included in the acquisition cost of the new owner because it constitutes a part of his/her saving. The current transfer associated with asset transaction is recorded on the use side of the secondary market asset transaction account of the new owner as well as on the resource side of the newly-introduced current transfers associated with secondary market transaction account.

In line with this, the purchase of existing goods for consumption is recorded as final consumption expenditure at secondary market on the use side of the vendee separately from the final consumption expenditure at primary market. The sale of existing goods⁴¹ shall be recorded on the resource side of current transfers associated with secondary market transaction account. The exports of existing goods are recorded on the use side of the account. As a result, the relations between the accounts are not simply sequential anymore. Instead, the revised format of national accounts clearly depicts not only the recycling process of existing goods but also the interactivity between real and financial economy. This will enhance understanding of the mechanism of generation and burst of financial bubbles and of consequent depressions within the framework of national accounts⁴².

The advantage of the historical cost accounting is the logical consistency between flow and stock accounts. In sharp contrast to 1993 SNA with *ad hoc* revaluation account, the changes in the asset value in this context is a result of the saving behavior and the portfolio choice of the institutional sectors. Moreover, since the current transfer associated with secondary market asset transaction has its counterpart in the allocation of income accounts, it will complete the total national accounts as a closed system (with

⁴¹ Existing goods are goods other than inventories that already have had a user. (European Communities (1996), par. 3.147.) In 1993 SNA, when an existing good is resold, the amount received from its sale is recorded as negative expenditure on the part of the seller. (United Nations *et al.* (1993), par. 9.31.) See Stone (1961) for further discussion.

⁴² For the interrelations between real and financial economy in the historical perspective, see Galbraith (1954), Kindleberger (1978) and Bernanke (2000) among many others.

the inclusion of the rest of the world account), in which the quadruple entry system applies without exception. Table 2 presents flows and stocks in an integrated framework, which makes it possible to clarify the relationship between savings and wealth and, therefore the relationship between income and wealth.

The distinction between realized and unrealized holding gains should be strictly observed because the former is a reality while the latter is merely an illusion. In Table 2, the realized capital gain is referred as current transfer associated with asset transaction, while the unrealized holding gain is put outside of the historical cost accounting sequence and recorded in the account of its own between the balance sheets at historical cost and at current value. With respect to corporate accounting, unrealized holding gain has some economic meaning because there is a possibility that the company might be able to sell all the assets in possession at the prevailing market price if necessary. In contrast to this, the unrealized holding gain plays minor role in the national accounting. There is no way to sell the total asset of a nation at the prevailing market price because a liquidation of a considerable portion of the national asset inevitably causes a crash in the secondary market.

However, this does not necessarily mean that the current value accounting adopted by the 1993 SNA is inadequate. Firstly, illusion might give some effects on the decision making of an economic unit; the wealth effect on the household consumption is a conspicuous example⁴³. Secondly, there is a good reason to measure physical assets in the replacement cost especially when they are used in the production process; the capital assets must be measured in what service they give rather than in how much you have paid to obtain them. For that reason Table 2 retains the essence of the revaluation account and uses it to bridge the gap between historical cost and current value in the closing balance sheets.

3.3 Accounting Examples

Let us take an example to clarify the difference between 1993 SNA and the revised format presented in Table 2, especially in the treatment of secondary market transactions of assets. We assume that no institutional sectors have any assets or liabilities at the beginning of the period. We further assume that the transactions (in terms of receipts and payments) each institutional sector engaged in the period are as follows:

[Non-financial corporation]

⁴³ For overall discussion of wealth effects, see Poterba (2000).

(Resources)

Final consumption expenditure of household: 90.

Gross fixed capital formation of general government: 30.

(Uses)

Compensation of employees paid to household: 100.

Acquisition of government security from household: 20 (acquisition value).

[Household]

(Resources)

Compensation of employees received from non-financial corporation: 100.

Sale of government security to non-financial corporation: 20 (proceeds from sale).

(Uses)

Final consumption expenditure paid to non-financial corporation: 90.

Acquisition of newly issued government security: 30 (acquisition value).

[General government]

(Resources)

Sale of newly issued government security to household: 30 (proceeds from sale).

(Uses)

Cost of gross fixed capital formation paid to non-financial corporation: 30.

In the current value accounting framework of 1993 SNA, there are two alternative ways to record the transactions. First example is shown in Table 3-1, in which the identity between saving-investment balance in the capital account and financial surplus/deficit in the financial account is presupposed. In this case, the cells of surplus/deficit in the financial account are automatically filled with the figures of balance in saving and investment. As a result, the transactions of government securities are erroneously recorded as if 10 out of 30 are purchased by the household and the rest is purchased by the non-financial corporation. The errors are corrected by the revaluation account *ex post*.

Another option is to allow discrepancy between saving-investment balance in the capital account and financial surplus/deficit in the financial account. Since net acquisition of financial asset and net incurrence of liabilities are presumed to be in balance, the transactions will be recorded as shown in Table 3-2. Although this accounting practice depicts the real transaction more or less accurately, the government security transactions by the household are not at all recorded in this scheme so is the

capital loss incurred by the sector. The foremost problem of this widely used method is that the discrepancy between the two balancing items (i.e. balance of saving and investment and financial surplus/deficit) is inevitable.

Table 3-3 is written in the revised format of national accounting presented in Table 2. In this table, the secondary market asset transactions are recorded separately from the primary market proceedings, thus the details of the financial transactions as well as of the realization of capital gain/loss are readily available. Since the realized capital gain also appears in the allocation of income accounts, the disposal of the additional revenue (either positive or negative) is recorded as well. The advantage of the new scheme is that there is no discrepancy between saving-investment balance in the capital account and financial surplus/deficit in the financial account, thus quadruple entry system works without flaw in this framework. The closing balance sheets at historical costs are obtainable from accumulation accounts alone, in this particular example. In more general case, the sum of the corresponding cells of the opening balance sheet and the capital accounts makes the closing balance sheet.

4. Concept of Income

4.1 Historical Perspectives

As we have mentioned in Section 2.3 above, the treatment of capital gain/loss is closely related to the concept of income. According to Lindahl (1919), there are four alternative definitions of income: income as consumption, income as produce, income as earnings and income as interest. As he clearly points out, the concept of income as interest is a purely theoretical notion while other three could be defined and measured within the framework of accounting. The main essentials of the concept of income as interest have been most clearly laid down by Fisher (1912) in his well known definitions: a stock of wealth existing at a given instant of time is called capital⁴⁴; a flow of benefits from wealth through a period of time is called income. The benefits in his terminology are abstract concepts rather than physical objects so that it cannot be carried over to the next period. It is logically conceivable that the income in this context is equivalent to the consumption of the period. That brings us to another concept of income: income as consumption. It should be noted that in Fisher's terminology, savings (an increment of capital during a period) are not part of income. However it also should

⁴⁴ Fisher excludes monetary assets from capital because they are merely the veil over the physical assets in his viewpoint. So called human capital is also excluded from the original definition. Fisher (1912), pp.37-39.

be noted that he did not exclude the possibility of autonomous increase or decrease of capital⁴⁵.

Although philosophically highly sophisticated and appealing, the concepts of capital, income and consumption in Fisher's terminology are sometimes considered too vague and too broad to measure⁴⁶. Hicks (1940) criticized Fisher saying his definition of social income (to exclude investment) was far more plausible as a measure of current economic welfare alone, than it seemed to be when we expected a measure of economic welfare to be a measure of productivity as well. Instead of adopting Fisher's approach, Richard Stone opted for the concept of income as produce in the grand design of 1968 SNA, and 1993 SNA is basically following the same footsteps. The definition of income, saving and investment in the framework of 1993 as well as 1968 SNA is essentially based on Chapter 6 of Keynes' *General Theory* (1936). In this case, income is defined analogously to the concept of production. Keynes defines income as being the excess of the value of finished output sold during a period over the prime cost, which is equivalent to the sum of the amount paid out to purchase intermediate goods and wear of producer's own capital. The definition of gross domestic products (GDP) as the total sum of value added is a logical extension of this idea. Since the output is either sold to an end-user for consumption or to another entrepreneur as intermediate or capital goods, the income is equivalent to the sum of consumption and investment. On the other hand, saving is defined as the portion of income that is not designated for consumption. Thus saving is inevitably equal to investment in this framework. Many practical-minded statisticians endorsed the Keynesian scheme⁴⁷ because of its clarity, measurability and manageability. An additional advantage of the system is that GDP is obtainable by calculating either of the followings so that you can cross-check the statistics: the sum of the value added (production approach), the total income generated by the production (income approach) or the total expenditures on all finished goods (expenditure approach)⁴⁸.

However, this definition of income is somewhat susceptible to Fisher's criticism because of its inclusion of investment as a part of income. Fisher excluded saving (thus

⁴⁵ See Fisher (1912) pp.134-135; Fisher (1930), pp.454-455.

⁴⁶ Although the author insists that his idea is based on Simon Kuznets, Eisner (1989) is a successful example in expanding the horizon of national accounting to the extent Fisher might have desired. *Ibid.*, pp.8-12.

⁴⁷ The framework is by no means Keynes' own invention. See Studenski (1958) for history of thoughts.

⁴⁸ Three different theoretical approaches are used in the estimation of one GDP quotation. See Meade and Stone (1941) and United Nations *et al.* (1993), par. 15.153. [United Nations Statistical Commission (2008), par.6.80.]

investment) from his definition of income on the ground that the definitions of saving and investment were ambiguous. Although there is no exact counterpart of Keynes' concept of investment in Fisher's theoretical framework, it is true that there is some ambiguity in the definition of investment in Keynes terminology because the distinction between intermediate and capital goods could be merely a matter of relativity. Intermediate goods are supposed to be consumed in the process of production of some other goods during a period, while capital goods are carried over to the next⁴⁹. The problem is that if you take an arbitrarily long accounting period, no goods shall be carried over to the next period because they are consumed within a period in whatever manner it is. In that sense, we should admit that the concept of income as consumption has its own merit, even apart from the purely theoretical meaning of Fisher's.

Another problem closely associated with the definition of income is that if we should include capital gain/loss accrued during a period. Lindahl (1919) argues that none of above definitions of income escapes this problem though, the concept of income as produce suffers most in this regards. Since Fisher describes capital as discounted income, there must be revaluation of capital whenever there is a change in the income flow; however the definition of income as interest or consumption shall be intact because it is tautological if the income itself is inclusive of capital gain/loss. On the other hand, it is not arguable that one of the dominant analytical tools of Keynes (1936) is the consumption function so that it is vital if he include capital gain/loss in the definition of income because marginal propensity to consume is heavily depending on it. We cannot afford to take this matter lightly because the *General Theory* clearly demonstrate that the combination of the behavioral equation (the consumption function reducible from utility function within the neo-classical framework) and the macro economic identity will explain the determination of equilibrium national income. Macro econometric models of many sorts flourished on this soil in the period of 1950s to 1970s before so called rational expectation revolution blew them apart⁵⁰.

Thus he was too hasty in his decision to abandon the concept of income as earnings (i.e. with capital gain/loss in addition to income as produce), in which Keynes had elaborated with such energy for some period⁵¹. It was plausible for Keynes' *Treatise*

⁴⁹ In this regard, the distinction between finished and capital goods is also ambiguous. For example, books are considered to be consumption goods (i.e. finished goods) but often sold in the secondary market. See footnote 42 above.

⁵⁰ For further discussion, see Vercelli (1991). After the rational expectations revolution, the "system" of national accounts was neglected because time series analysis replaced the multi-sector macro econometric models.

⁵¹ In his disquisition about money, John K. Galbraith criticized the *General Theory* as prematurely published. See Galbraith (1975), p.218.

on Money (1930) to include capital gain/loss in its concept of income because the world was battered by the Great Depression by then. Since the studies in financial bubbles and depressions are indispensable part of economics, the importance of concept of income as earnings should not be overlooked. Although Lindahl (1919) was somewhat inclined to the concept of income as interest at the time of publication, he drifted toward the concept of income as earnings later with his *ex ante / ex post* exposition of national accounts, which is a logical extension of the *Treatise*, by the time he published Lindhal (1939)⁵².

4.2 All-in-one Presentation Format of National Accounts

One of the advantages of the presentation format of national accounts proposed in Table 2 is that this configuration accommodates alternative definitions of income mentioned above, namely income as consumption, income as produce and income as earnings. The goods and services account is used to calculate gross value added at market prices, which is the component of gross domestic products. The composition of final demand (i.e. expenditure) is also available in this account. By simply deducting the value-added type taxes minus subsidies, we will obtain gross value added at factor costs, which is equivalent to income as produce. The distribution of income among production factors is depicted in the generation of income account. The generated income is apportioned among institutional sectors as detailed in the allocation of primary income account. The disposable income in the scheme is obtainable in the secondary distribution of income account as a result of reallocation of income through social security mechanism and so on. The shaded portion of Table 2 (current transfers associated with secondary market transaction) is irrelevant as far as the concept of income as produce is concerned. A part of disposable income is designated for final consumption (i.e. income as consumption⁵³) in some of the sectors and the rest is saved and carried over to the capital accounts. The saving is used for capital formation and the remainder is used to purchase financial or non-produced assets⁵⁴. Since acquisition of assets and incurrence of liabilities are balanced in both primary and secondary market asset transaction accounts, the saving is necessarily equal to investment, which consists

⁵² In the widest sense, the concept of *ex ante / ex post* means two-step achievement of equilibrium. It is possible to interpret Table 2 in such manner. Appended Table is an example of *ex ante / ex post* exposition of Table 3-3. An interpretation of the capital gain/loss generating mechanism, which relates it to the saving-investment discrepancy as Keynes (1930) suggests, is demonstrated there. See footnote 58 below.

⁵³ This is one of the observable counterparts of income as consumption, however far from the original concept of Fisher's.

⁵⁴ Some existing (secondhand) produced assets might be included.

of the items appearing in the capital account. It should be reminded that the accounts are balanced above the dotted line drawn in the secondary market asset transaction account.

As mentioned earlier, the shaded portions of the table are irrelevant to income as produce; however the segments have maximum significance in the concept of income as earnings. Although realized capital gain/loss is an essential part of the disposable income of a sector, it does not affect the national income because it merely is a redistribution of income rather than a generation of it. Gross national income (GNI) is still equal to GDP plus net primary incomes receivable from non-resident units⁵⁵. However under the concept of income as earnings, gross national disposable income is not obtainable by simply summing up gross national income and net current transfer receivable from abroad because current transfer associated with secondary market transaction is also an indispensable component. Since the transfer comes from the accumulation account rather than from the allocation of income account, the portion is deliberately double counted; so that gross national disposable income as earnings can be far different from gross national income when capital gain/loss is not negligible. According to Lindahl's classification⁵⁶, gross national income is a measure of income as produce while gross national disposable income in the above sense is an indicator of income as earnings⁵⁷. It should be noted that the saving is not a synonymous of investment under the concept of income as earnings as Keynes (1930) have demonstrated using his renowned fundamental equations⁵⁸.

There is a very good reason to revive the concept of income as earnings today. The problem is that the boundary between production and transfer is not clear as it used to be. In the 1968 SNA, interest payment was categorized as property income and treated as a whole as transfer payment between sectors. However, the 1993 SNA introduced a new concept called FISIM (financial intermediation services indirectly measured) so that some part of the property income is recorded as output of the financial sector rather than merely as a transfer⁵⁹. Another problem is that the rapid development of information technology gives more opportunity, even for the

⁵⁵ United Nations *et al.* (1993), par. 2.181. [United Nations Statistical Commission (2008), par.2.141.]

⁵⁶ See Lindahl (1919).

⁵⁷ The treatment of capital gain in Eisner (1988) is not far different from the scheme mentioned here.

⁵⁸ Keynes (1930), pp.120-126. The fundamental equations were attempts to realize the proposition enunciated by Wicksell (1898). Although Keynes failed to complete the equation system, Hicks (1967) accomplished it by borrowing missing equation (i.e. consumption function) from the *General Theory*. For a dynamic interpretation of the fundamental equations, see Hammarskjöld (1932).

⁵⁹ United Nations *et al.* (1993), par. 6.125.

households, to sell their belongings at the secondary market. The best way to distinguish secondary market transactions from primary market transactions is to record the payment of the former as current transfer (just like in case of capital gain/loss), not as negative production as 1993 SNA recommends⁶⁰. It is problematic because a payment for the sale of existing goods itself is current transfer while the associated service is production; it is rather difficult to distinguish one from another. These events make it more and more difficult to draw a rigid line between production and transfer. It means value added no longer serve as a very good indicator of income. Since the income as earnings consists not only of the income from production but also of the receipts from transfers, it might be a more objective indicator of income in a highly developed economy in which redistribution of income not only through the government policy but also through the market mechanism have vital importance. Moreover, the concept of income as earnings might have some meaning even if capital gain/loss is excluded (i.e. double counting is avoided). Such indicator must be an appropriate measure of economic growth because it does include the reuse of existing goods, thus economic growth does not necessarily mean to consume more natural resources and to emit more greenhouse gases; it is environment friendly indeed⁶¹.

5. Concluding Remarks

One of the advantages of Roman law is simplicity. It is true that the system of national accounts is a highly complicated entity. However, if you would accept the civil law as its fundamental principle, you can judge every detail by that standard without too much difficulty. The civil law has been adopted by many countries of the world for centuries and no fatal problem is reported. Actually it has a history of more than two thousand years. The quadruple entry system based on it gives a rigorous accounting framework to the system of national accounts when it is combined with the historical cost accounting. Such a system retains all the desirable features of modern accounting: intra-sector consistency, inter-sector consistency and intertemporal consistency.

The foremost feature of the system of national accounts is that it is a set of statistics organized by taking their interdependency into consideration; it is not merely a collection of fragmentary statistics. It was Ragnar Frisch who established the basic principles of present day system of national accounts seven decades ago.

⁶⁰ See footnote 41 above.

⁶¹ GDP in the 1993 SNA framework discourage the recycling of goods because it is designated as a negative factor for economic growth.

“By national accounts we mean not only a picture of the national income in a given year or the national wealth at a given point of time, but a reasonably complete survey of the total economic activity of a nation in a year, presented in a way which allows the interrelationships between different data to be clearly demonstrated. The presentation must be such that relationships which are particularly interesting show up by accounting necessity. For instance, change in wealth should by accounting necessity correspond with data on income, consumption and saving.”

(Excerpt from Frisch (1940) as translated in Aukrust (1994).)

As his inspiring Økosirk-systemet⁶² (Eco-circ graph⁶³) clearly demonstrates, it was his intention to depict the interconnection between real and financial economic circulations in a consistent framework of national accounting. He tried to accomplish it in his unfinished work called REFI⁶⁴ Interflow Table⁶⁵, which was a sector × commodity/instrument matrix resembling in appearance to the social accounting matrix (SAM) initiated by Richard Stone⁶⁶. One of the main objectives of the REFI model was an explicit introduction of financial objects and of their trading operation; these operations must be analytically coordinated with the operations in real objects so as to arrive at a coherent common system⁶⁷. The social accounting matrix, which also incorporates financial sectors, shares the same philosophy.

As we have seen in the previous sections, a combination of the quadruple entry system and the historical cost accounting meets all the criteria Frisch might have desired. The advantage of historical cost accounting is the logical consistency between flow and stock accounts. In sharp contrast to 1993 SNA with *ad hoc* revaluation account, the changes in the asset value in this context is a result of the saving behavior and the portfolio choice of the institutional sectors. Since the current transfer associated with secondary market asset transaction has its counterpart in the allocation of income

⁶² See Frisch (1943).

⁶³ For English version, see Aukrust (1994).

⁶⁴ REFI is an abbreviation for “real and financial”.

⁶⁵ In collaboration with his colleagues at Økonomisk Institutt, Universitetet i Oslo. See Frisch (1955, 1964) for further discussion.

⁶⁶ SAM was developed by Richard Stone and his associates at Department of Applied Economics, University of Cambridge. The original version of SAM was an input-output table with the intersection of value added and final demand, which were omitted in the original Leontief version. The fundamental difference between Leontief’s input-output table and Stone’s SAM is that the former is commodity-flow oriented while the latter is money-flow oriented. See Leontief (1941) and Stone (1962) for details. An expanded version of SAM gave the theoretical foundation for the 1968 SNA. See United Nations Statistical Office (1968) for details.

⁶⁷ Quoted from Frisch (1964).

accounts, it will complete the total national accounts as a closed system. Moreover, the scheme presents flows and stocks in an integrated framework, which makes it possible to clarify the relationship between savings and wealth and, therefore the relationship between income and wealth.

Half a century has passed since the official launch of the system of national accounts by the United Nations in 1953. The two comprehensive revisions in 1968 and 1993 certainly expanded the scope of the system a great deal. However only a tiny portion of the entire system is exploited so far and vast majority is still unutilized in the economic analysis. The foremost advantage of the system of national accounts is that it is the only statistics that depicts the interrelations between financial and real economy. As we have seen, in the perspective of historical cost accounting, the revaluation of assets is an endogenous phenomenon rather than an exogenous one so that the accumulation account alone describes revaluation as well as accumulation without introduction of an arbitrary account known as the revaluation account. This will enhance understanding of the interactions between financial and real phenomena such as financial/real-estate bubbles and crashes, which have maximum relevance to the secondary asset market so as to the revaluation, and subsequent depressions, which directly relates to the real economy, well within the framework of the system of national accounts.

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Table 1. 1993SNA Classified by Institutional Sectors

(Japan, 2004, in trillion yen)

	Non-financial corporations		Financial corporations		General government		Households		Non-profit institutions serving households		Rest of the world		Total
	Assets/ Uses	Liabilities/ Resources	Assets/ Uses	Liabilities/ Resources	Assets/ Uses	Liabilities/ Resources	Assets/ Uses	Liabilities/ Resources	Assets/ Uses	Liabilities/ Resources	Assets/ Uses	Liabilities/ Resources	
Opening balance sheet													
Inventories	56				2		18						76
Fixed assets	528		25		320		226		15				1114
Non-produced assets	305		12		129		813		27				1286
Financial assets	713		2924		443		1412		45		233		5770
Liabilities		1220		2920		822		381		20		406	-5770
Net worth		382		41		73		2088		67		-172	-2479
Sub-total	1603	1603	2962	2962	896	896	2470	2470	88	88	233	233	0
Allocation of income accounts													
Allocation of primary income account													
Compensation of employees								255			0	0	-255
Operating surplus and mixed income		52		-6				47					-93
Property income	26	10	37	61	13	7	14	21	0	0	13	4	0
Taxes on production and imports													-41
Subsidies on production					4								4
Imports of goods and services											66		66
Exports of goods and services												56	-56
Balance of primary incomes	36		17		31		310		0		-19		375
Sub-total	62	62	54	54	48	48	324	324	0	0	60	60	0
Secondary distribution of income account													
Balance of primary incomes		36		17		31		310		0		-19	-375
Current taxes on income, wealth, etc.	13		1			37		23					0
Social benefits other than social transfers in kind	6		6		55		68		0				0
Social Contributions		6		6		51		65		0			0
Other current transfers	3	4	4	5	52	48	22	18	0	6	1	2	0
Disposable Income	23		17		60		287		6				393
Current external balance											-18		-18
Sub-total	46	46	28	28	167	167	397	397	6	6	-17	-17	0
Use of disposable income account													
Disposable Income		23		17		60		287		6			-393
Final consumption expenditure						89		278		6			373
Saving	23		16		-28		8		0				19
Sub-total	23	23	17	17	60	60	287	287	6	6	0	0	0
Accumulation accounts													
Capital account													
Saving		23		16		-28		8		0		-18	0
Gross fixed capital formation	67		3		19		21		1				111
Consumption of fixed capital	-64		-3		-14		-21		-1				-103
Changes in inventories	-1				0		0						-1
Acquisition less disposals of non-produced assets	0		0		2		-1		0				0
Capital transfers		2		-6		4		-1		0	0	0	0
Net lending / net borrowing (Balance of saving and investment)	24		11		-31		8		0		-18		-6
Sub-total	25	25	10	10	-24	-24	7	7	0	0	-18	-18	0
Financial account													
Net lending / net borrowing (Financial surplus or deficit)		25		7		-31		12		3		-18	2
Net acquisition of financial assets	20		16		35		7		1		32		112
Net incurrence of liabilities		-5		9		66		-5		-2		50	-112
Sub-total	20	20	16	16	35	35	7	7	1	1	32	32	0
Other changes in assets accounts													
Other changes in volume of assets account													
Inventories					0								0
Fixed assets					0								0
Non-produced assets													0
Financial assets	3		-8		0		-5						-10
Liabilities		-9		-7		0		1		0			15
Net worth		13		0		0		-7		0			-6
Sub-total	3	3	-8	-8	0	0	-5	-5	0	0	0	0	0
Revaluation account													
Inventories	1				0		-1						0
Fixed assets	8		0		8		3		0				19
Non-produced assets	-4		0		-11		-29		0				-44
Financial assets	13		22		0		19		0				54
Liabilities		48		19		-3		0					-64
Net worth		-30		3		0		-8		0			35
Sub-total	18	18	22	22	-3	-3	-8	-8	0	0	0	0	0
Closing balance sheet													
Inventories	56				2		16						74
Fixed assets	540		26		329		226		16				1137
Non-produced assets	301		11		122		783		26				1243
Financial assets	752		2955		478		1433		46		270		5935
Liabilities		1255		2941		886		378		19		456	-5935
Net worth		395		52		46		2081		71		-185	-2460
Sub-total	1650	1650	2993	2993	933	933	2460	2460	90	90	270	270	0

Data Source: Annual Report of National Accounts of Japan 2006 .

	Current external balance (income as earnings)	h6											Lh6	g5	
	Saving (income as produce)	h7	Ah7		Ch7		Eh7		Gh7		Ih7		Kh7	i1	
	Saving (income as earnings)	h8	Ah8		Ch8		Eh8		Gh8		Ih8		Kh8	i2	
	Sub-total		Ah	Bh	Ch	Dh	Eh	Fh	Gh	Hh	Ih	Jh	Kh	Lh	
Accumulation accounts															
Capital account															
	Saving (income as produce)	i1		Bi1		Di1		Fi1		Hi1		Ji1		Li1	h7
	Saving (income as earnings)	i2		Bi2		Di2		Fi2		Hi2		Ji2		Li2	h8
	Changes in inventories	i51	Ai51				Ei51		Gi51		Ii51				b5
	Gross fixed capital formation	i52	Ai52		Ci52		Ei52		Gi52		Ii52				b4
	Consumption of fixed capital	i52*	Ai52*		Ci52*		Ei52*		Gi52*		Ii52*				d3
	Capital transfers	i3	Ai3	Bi3		Di3		Fi3		Hi3		Ji3	Ki3	Li3	balanced
	Net lending / net borrowing (income as produce)	i4	Ai4		Ci4		Ei4		Gi4		Ii4		Ki4		j1
	Net lending / net borrowing (income as earnings)	i5	Ai5		Ci5		Ei5		Gi5		Ii5		Ki5		j2
	Sub-total		Ai	Bi	Ci	Di	Ei	Fi	Gi	Hi	Ii	Ji	Ki	Li	
Primary market financial transaction account															
	Net lending / net borrowing (income as produce)	j1		Bj1		Dj1		Fj1		Hj1		Jj1		Lj1	i4
	Net lending / net borrowing (income as earnings)	j2		Bj2		Dj2		Fj2		Hj2		Jj2		Lj2	i5
	Acquisition of financial assets	j54	Aj54		Cj54		Ej54		Gj54		Ij54		Kj54		j55
	Incurrence of liabilities	j55		Bj55		Dj55		Fj55		Hj55		Jj55		Lj55	j54
	Balance of primary market transactions (income as produce)	j3	Aj3		Cj3		Ej3		Gj3		Ij3		Kj3		k1
	Balance of primary market transactions (income as earnings)	j4	Aj4		Cj4		Ej4		Gj4		Ij4		Kj4		k2
	Sub-total		Aj	Bj	Cj	Dj	Ej	Fj	Gj	Hj	Ij	Jj	Kj	Lj	
Secondary market asset transaction account															
	Balance of primary market transactions (income as produce)	k1		Bk1		Dk1		Fk1		Hk1		Jk1		Lk1	j3
	Balance of primary market transactions (income as earnings)	k2		Bk2		Dk2		Fk2		Hk2		Jk2		Lk2	j4
	Inventories	k51	Ak51				Ek51		Gk51		Ik51				balanced
	Fixed assets	k52	Ak52		Ck52		Ek52		Gk52		Ik52				balanced
	Non-produced assets	k53	Ak53		Ck53		Ek53		Gk53		Ik53				balanced
	Financial assets	k54	Ak54		Ck54		Ek54		Gk54		Ik54		Kk54		balanced
	Liabilities	k55		Bk55		Dk55		Fk55		Hk55		Jk55		Lk55	balanced
	Current transfers associated with asset transactions (inventories)	k51*	Ak51*				Ek51*		Gk51*		Ik51*				g51
	Current transfers associated with asset transactions (fixed assets)	k52*	Ak52*		Ck52*		Ek52*		Gk52*		Ik52*				g52
	Current transfers associated with asset transactions (non-produced assets)	k53*	Ak53*		Ck53*		Ek53*		Gk53*		Ik53*				g53
	Current transfers associated with asset transactions (financial assets)	k54*	Ak54*		Ck54*		Ek54*		Gk54*		Ik54*		Kk54*		g54
	Current transfers associated with asset transactions (liabilities)	k55*		Bk55*		Dk55*		Fk55*		Hk55*		Jk55*		Lk55*	g55
	Sub-total		Ak	Bk	Ck	Dk	Ek	Fk	Gk	Hk	Ik	Jk	Kk	Lk	
Other changes in volume of assets account															
	Inventories	i51	Ai51				Ei51		Gi51		Ii51				
	Fixed assets	i52	Ai52		Ci52		Ei52		Gi52		Ii52				
	Non-produced assets	i53	Ai53		Ci53		Ei53		Gi53		Ii53				
	Financial assets	i54	Ai54		Ci54		Ei54		Gi54		Ii54		Ki54		
	Liabilities	i55		Bi55		Di55		Fi55		Hi55		Ji55		Li55	
	Net worth	i56		Bi56		Di56		Fi56		Hi56		Ji56			
	Net external assets	i57												Li57	
	Sub-total		Ai	Bi	Ci	Di	Ei	Fi	Gi	Hi	Ii	Ji	Ki	Li	
Closing balance sheet (at historical cost)															
	Inventories	m51	Am51				Em51		Gm51		Im51				[accumulation]
	Fixed assets	m52	Am52		Cm52		Em52		Gm52		Im52				m51=a51+i51+k51+k51*+i51
	Non-produced assets	m53	Am53		Cm53		Em53		Gm53		Im53				m52=a52+i52-i52*+k52+k52*+i52
	Financial assets	m54	Am54		Cm54		Em54		Gm54		Im54		Km54		m53=a53+k53+k53*+i53
	Liabilities	m55		Bm55		Dm55		Fm55		Hm55		Jm55		Lm55	m54=a54+i54+k54+k54*+i54
	Net worth	m56		Bm56		Dm56		Fm56		Hm56		Jm56			m55=a55+j55+k55+k55*+i55
	Net external assets	m57													
	Sub-total		Am	Bm	Cm	Dm	Em	Fm	Gm	Hm	Im	Jm	Km	Lm	
Unrealized holding gain/loss account															
	Inventories	n51	An51				En51		Gn51		In51				
	Fixed assets	n52	An52		Cn52		En52		Gn52		In52				
	Non-produced assets	n53	An53		Cn53		En53		Gn53		In53				
	Financial assets	n54	An54		Cn54		En54		Gn54		In54		Kn54		
	Liabilities	n55		Bn55		Dn55		Fn55		Fn55		Jn55		Ln55	
	Net worth	n56		Bn56		Dn56		Fn56		Fn56		Jn56			
	Net external assets	n57												Ln57	
	Sub-total		An	Bn	Cn	Dn	En	Fn	Gn	Hn	In	Jn	Kn	Ln	
Closing balance sheet (at current value)															
	Inventories	o51	Ao51				Eo51		Go51		Io51				[revaluation]
	Fixed assets	o52	Ao52		Co52		Eo52		Go52		Io52				o51=m51+n51
	Non-produced assets	o53	Ao53		Co53		Eo53		Go53		Io53				o52=m52+n52
	Financial assets	o54	Ao54		Co54		Eo54		Go54		Io54		Ko54		o53=m53+n53
	Liabilities	o55		Bo55		Do55		Fo55		Ho55		Jo55		Lo55	o54=m54+n54
	Net worth	o56		Bo56		Do56		Fo56		Ho56		Jo56			o55=m55+n55
	Net external assets	o57													
	Sub-total		Ao	Bo	Co	Do	Eo	Fo	Go	Ho	Io	Jo	Ko	Lo	

Note1: The shaded portions are applicable to income as earnings only.
Note2: # indicates exports of existing goods.

Table 3-1. Accounting example A (1993 SNA)

		Non-financial corporation		Household		General government	
		Assets/Uses	Liabilities/Resources	Assets/Uses	Liabilities/Resources	Assets/Uses	Liabilities/Resources
Production account	Compensation of employees	100					
	Final consumption expenditure		90				
	Gross fixed capital formation		30				
	Operating surplus	20					
Allocation of income account	Operating surplus		20				
	Compensation of employees				100		
	Disposable income	20		100			
Use of disposable income account	Disposable income		20		100		
	Final consumption expenditure			90			
	Saving	20		10			
Accumulation accounts Capital account	Saving		20		10		
	Gross fixed capital formation					30	
	Balance of saving and investment	20		10		-30	
Financial transaction account	Financial surplus or deficit		20		10		-30
	Net acquisition of financial assets	20		10			
	Net incurrence of liabilities						30
Revaluation account	Financial assets			-10			
	Liabilities						-10
Closing balance sheet (Current value)	Financial assets	20		0		0	
	Liabilities		0		0		20

Table 3-2. Accounting example B (1993 SNA)

		Non-financial corporation		Household		General government	
		Assets/Uses	Liabilities/Resources	Assets/Uses	Liabilities/Resources	Assets/Uses	Liabilities/Resources
Production account	Compensation of employees	100					
	Final consumption expenditure		90				
	Gross fixed capital formation		30				
	Operating surplus	20					
Allocation of income account	Operating surplus		20				
	Compensation of employees				100		
	Disposable income	20		100			
Use of disposable income account	Disposable income		20		100		
	Final consumption expenditure			90			
	Saving	20		10			
Accumulation accounts Capital account	Saving		20		10		
	Gross fixed capital formation					30	
	Balance of saving and investment	20		10		-30	
Financial transaction account	Financial surplus or deficit		30		0		-30
	Net acquisition of financial assets	30					
	Net incurrence of liabilities						30
Revaluation account	Financial assets	-10					
	Liabilities						-10
Closing balance sheet (Current value)	Financial assets	20		0		0	
	Liabilities		0		0		20

Table 3-3. Accounting example C (revised format)

		Non-financial corporation		Household		General government	
		Assets/Uses	Liabilities/Resources	Assets/Uses	Liabilities/Resources	Assets/Uses	Liabilities/Resources
Production account							
	Compensation of employees	100					
	Final consumption expenditure		90				
	Gross fixed capital formation		30				
	Balance of production and outlay	20		0			
Allocation of income account							
	Balance of production and outlay		20		0		
	Compensation of employees				100		
	Balance of primary incomes	20		100			
Current transfers associated with secondary market asset transaction account							
	Balance of primary incomes		20		100		
	Current transfers associated with secondary market asset transactions						
	Disposable Income	20		90			
Use of disposable income account							
	Disposable Income		20		90		
	Final consumption expenditure			90			
	Saving	20		0			
Accumulation accounts							
Capital account							
	Saving		20		0		
	Gross fixed capital formation					30	
	Balance of saving and investment	20		0		-30	
Primary financial transaction account							
	Financial surplus or deficit		20		0		-30
	Purchase of newly issued bond			30			
	New issue of bond						30
	Balance of primary market transactions	20		-30		0	
Secondary market asset transaction account							
	Balance of primary market transactions		20		-30		0
	Purchase of existing bond	30					
	Sale of existing bond				30		
	Current transfers associated with secondary market asset transactions						
		-10					
Closing balance sheet (Historical cost)							
	Financial assets (Bond)	20		0		0	
	Liabilities		0		0		30
Unrealized holding gain/loss account							
	Financial assets (Bond)	0		0		0	
	Liabilities		0		0		-10
Closing balance sheet (Current value)							
	Financial assets (Bond)	20		0		0	
	Liabilities		0		0		20

Appended Table. Accounting example (revised format; *ex ante* / *ex post* exposition)

		Non-financial corporation				Household				General government			
		Assets/Uses		Liabilities/Resources		Assets/Uses		Liabilities/Resources		Assets/Uses		Liabilities/Resources	
		<i>ex post</i>	<i>ex ante</i>	<i>ex post</i>	<i>ex ante</i>	<i>ex post</i>	<i>ex ante</i>	<i>ex post</i>	<i>ex ante</i>	<i>ex post</i>	<i>ex ante</i>	<i>ex post</i>	<i>ex ante</i>
Production account	Compensation of employees		100										
	Final consumption expenditure				90								
	Gross fixed capital formation				30								
	Balance of production and outlay		20				0						
Allocation of income account	Balance of production and outlay				20				0				
	Compensation of employees								100				
	Balance of primary incomes		20				100						
Current transfers associated with secondary market asset transaction account	Balance of primary incomes				20								
	Current transfers associated with secondary market asset transactions												
	Disposable Income		20			-10	100						
Use of disposable income account	Disposable Income				20								
	Final consumption expenditure						90						
	Saving		20			-10	10						
Accumulation accounts Capital account	Saving				20								
	Gross fixed capital formation								-10	10			
	Balance of saving and investment		20			-10	10				30		
Primary financial transaction account	Financial surplus or deficit				20								
	Purchase of newly issued bond						30						
	New issue of bond												30
	Balance of primary market transactions		20			-10	-20				0		
Secondary market asset transaction account	Balance of primary market transactions				20								0
	Purchase of existing bond		30										
	Sale of existing bond												30
	Current transfers associated with secondary market asset transactions				-10								
Closing balance sheet (Historical cost)	Financial assets (Bond)		20				0				0		
	Liabilities												30
Unrealized holding gain/loss account	Financial assets (Bond)						0				0		
	Liabilities												-10
Closing balance sheet (Current value)	Financial assets (Bond)		20				0				0		
	Liabilities				0								20

Note: See footnote 52 for explanation.