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HOW SAVING DATA IS ESTIMATED

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Abstract
Gross national saving is one of the widely used economic data in empirical studies, and it used in for saving-investment debate, economic growth and similar studies. However, there is a discrepancy between the general definition of saving and gross national saving data. Gross national saving does not represent a certain amount of funds, it is estimated or derived *ex post*. This study will focus on two different methods of the estimation of gross national saving and the methodology of these estimations. These findings show that using gross national saving cannot be used in empirical studies for saving-investment debate or similar studies.

Keywords: Investment; Saving; Saving data
JEL Classifications: E20, E21, E22, C80

1. INTRODUCTION

Saving and its relationship with investments have always constituted a major place in economics since the Ricardo and Malthus debate (Pollin, 1997a: 1). The debate is built on whether saving leads to investment, or expenditure and income generate savings. According to orthodox economics, saving should emerge first to finance investments and this approach is known as the loanable funds theory. Keynes (1936) challenged this view in his *General Theory*, and offered a new paradigm for economics. Though Keynes' writings have been one of the most influential ones in economics, the loanable funds theory survived and also revived in the neoliberal era. However, it is difficult to test these two approaches as saving must be equal to investment in either case. Saving (supply for loanable funds) and investments (demand for loanable funds) are equal to each other at the market equilibrium in loanable funds theory. And at the aggregate level savings and investments are also equal in a national economy as pointed by Keynes (1936).

However, one aspect of this issue remains unnoticed; how saving is defined in macroeconomics, and how it is estimated. When economists refer to saving-investment equality, do they refer to gross or

net saving? Even though economists from different backgrounds use saving data in their studies, the estimation of saving is often ignored. And in this study, a different approach will be used for saving-investment debate. Instead of using a theoretical framework or causality tests, we will discuss how national and international statistics institutions gather saving data. This approach can supply valuable information about the nature of saving.

Since 1953, United Nations' *System of National Accounts* (SNA) has been the main guide for gathering economic data, and all other institutions collect and release economic data based on this guide. It is our main argument that SNA methodology shows saving data is estimated *ex post* as a residual; and *ex ante* saving does not exist. And we will support this view in three different steps. In the first step, we will look at how gross national saving is estimated at the aggregate level through national income identities by using *IMF's World Economic Outlook* database. At the aggregate level gross national saving is estimated by adding investment to current account balance. In the second step, we will try to show that gross national saving is not equal to what domestic sectors *actually* save. And we will use BEA's National Income and Product Accounts (NIPA) of the U.S. to show the relationship between gross saving, net saving and consumption of fixed capital. And finally in the third step, we will discuss how saving is conceptually defined in SNA methodology for all economic units. SNA lists economic data in terms of flows, changes in stocks, and final stocks in three different major accounts. In these accounts, saving emerges as a residual to connect flow accounts to changes in stock accounts; and saving does not represent a constraint for economic units as these units can spend more or less than their income or saving.

The SNA methodology of data gathering, and data itself show that saving exists only *ex post*, and there are no traces of *ex ante* savings. The idea of *ex post* saving does not create a problem for the Keynesian system. However, loanable funds theory requires existence of *ex ante* savings as it is a Marshallian partial equilibrium analysis with a demand and supply mechanism; the supply should be ready for market equilibrium to take place. Thus, this difference between ex ante and ex post savings is crucial in understanding the nature of macroeconomic events, and developing macroeconomic policies. Promoting national savings is often seen as a remedy for current account deficits, government and foreign

debt, and sluggish economic growth (Loayza *et al.*, 2000; Aghion *et al.*, 2009; World Bank, 2011; IMF, 2014). However, if saving is an outcome, not the cause, of economic events, the order of economic policies should be rearranged.

For these reasons, we will discuss savings in three steps as mentioned above. The next section will cover the estimation of gross national saving and its relationship with investment and current account balance. The third section will focus on the savings of domestic sectors (net saving) and the difference between these net savings and gross saving. The fourth section will explain the methodology of SNA for savings. The final comments will be given in the conclusion section.

2. Saving at the Aggregate Level

The orthodox understanding of saving is based on the loanable funds theory, and savings are needed in order to finance investments. In this approach there are two different economic groups in an economy, i.e. lenders and borrowers. And these two groups meet in financial markets through direct and indirect finance. Commercial banking system, and asset markets are passive financial intermediaries for the transfer of these funds. In this representation, "…all savings flow into one undifferentiated 'pool' of funds that can be used indifferently to finance any form of investment" (Blecker, 1997: 191). As savings are equal to investments, it is very difficult to empirically test this or counterviews on the issue.[1] However, the definition of saving data can supply important information for this debate. And there is a discrepancy between the definition of savings in SNA and how it is interpreted in orthodox studies. This section will be built on this discrepancy through three examples and these examples will be compared with the definition of gross national savings in SNA methodology.

First of all, IMF's discussion of real interest rates can show this discrepancy. In April 2014, IMF's World Economic Outlook devoted a chapter of the report for the discussion of worldwide decline in real interest rates. In this chapter, IMF used a loanable funds approach as shown in Figure 1, and argued that

[1] Gordon (1997), Blecker (1997), and Pollin (1997b) analyzed saving-investment causality from a heterodox perspective among others. IMF also published similar findings, and with causality tests their report concludes "…even though the causality between saving and growth runs in both directions, the observed positive correlation between growth and saving must be driven by the effects of changes in growth on saving rates, not the other way around" (IMF, 2014: 107).

if real interest rates are falling, demand for funds (investment) must have decreased and supply for funds (saving) increased. This simple demand and supply mechanism was reported as the underlying reason of declining real interest rates in the world economy without mentioning financial system and recent developments. This explanation shows how widely the loanable funds theory is accepted, as the report did not use any saving or investment data to support these arguments. However, IMF's own World Economic Outlook database has world saving and investment data as a percentage of world GDP, yet these series do not show any significant decrease for investment and increase in saving at a global scale in recent years (Figure 2 below).

Figure 1 Here

Figure 2 Here

IMF's report built its discussion on loanable funds mechanism without referring to economic data. There are many other studies in economics that used the conceptual framework of loanable funds theory without discussing the data itself. A second example, and a famous one, is the Feldstein-Horioka Puzzle, which is considered as one of the six greatest puzzles in macroeconomics (Obstfeld and Rogoff, 2001). In two different articles, Feldstein and Horioka (1980), and Feldstein and Bachetta (1991) tested whether foreign savings in OECD countries replaced domestic savings after financial liberalization. And for this purpose, Feldstein and Horioka (1980: 318) estimated the following equation for OECD countries for years 1960-1974:

$$(I/Y) = \alpha + \beta(S/Y) + \varepsilon \qquad (1)$$

In equation (1), I represents total investment, S represent gross national saving, and Y represents gross domestic product in the equation. The purpose of Feldstein and Horioka was to test whether foreign savings had replaced the domestic savings in financing investments; thus, they were expecting a low β value. However, a high β coefficient was found which meant domestic savings were financing domestic investments even after financial liberalization. This result was later known as the Feldstein-Horioka Puzzle

and almost every econometric method was used to see if a different result would appear. Even after greater international financial integration the results are not seemed to change significantly.[2]

In fact this puzzle builds on the discrepancy between the definition of saving and gross national saving data as mentioned above. Feldstein and Horioka (1980) used gross national savings and investments data from OECD databases in their analysis. And the definition of gross national saving can explain the puzzle itself without using any empirical analysis. OECD uses gross national saving and investment data according to SNA definition, and in this definition national saving data is defined as follows: "Gross national saving is gross disposable income less final consumption expenditure after taking account of an adjustment for pension funds. [SNA 1993] *For many countries, the estimates of national saving are built up from national accounts data on gross domestic investment and from balance of payments-based data on net foreign investment*" (IMF, 2016).[3] Based on this definition, gross national saving data is *derived* from gross national investment data with adjustments for capital flows. Even though WEO database has limited information about the derivation of savings, SNA 1993 shows that gross national saving data can be derived through basic income accounting identities (SNA, 1993: 55, 256, 274). According to this, gross domestic product equals to the sum of consumption, investment, government spending, and net exports:

$$GDP = C + I + G + NX \quad (2)$$

$$GDP + F = C + I + G + NX + F, \quad (3)$$

where F is net factor incomes from abroad.

$$GNI = C + I + G + NX + F, \quad (4)$$

where GNI is gross national income.

$$GNI + TR = C + I + G + NX + F + TR, \quad (5)$$

[2] This puzzle also attracted the heterodox economists' attention, as many of them argued for investment leads to saving. Gordon (1997) criticized Feldstein and Horioka's arguments with an empirical model for U.S. economy, and argued that savings responds to investments but not vice versa. Similarly, Blecker (1997) argued that both saving and investments might be determined by a third variable, and this may be the reason for strong correlation between these two.

[3] Emphasize is ours.

where TR is all net current transfers in cash or in kind receivable/payable by resident institutional units from non-resident.

$$GNDI = C + I + G + CAB, \quad (6)$$

where GNDI is gross national disposable income, and CAB is current account balance

$$GDI - C - G = I + CAB, \quad (7)$$

And, as a result,

$$GNS = I + CAB, \quad (8)$$

where GNS is gross national saving.

These steps show that SNA 1993 and WEO database offers a simple explanation to Feldstein-Horioka puzzle; i.e., gross national saving is simply gross investment plus current account balance (equation 8) at the aggregate level. Thus, we can re-define Feldstein and Horioka's (1980) initial equation as

$$(I/Y) = \alpha + \beta((I+CAB)/Y) + \varepsilon \quad (9)$$

and β coefficient would always be very high due to the definition of gross national saving. However, β coefficient can decline if the size of current account surplus or deficit increases in absolute value. And new studies showed that beta has been in decline (Blanchard and Giavazzi, 2002; and World Bank, 2011), but the only possibility for β coefficient to be low in accordance with puzzle is to have a very large CAB. However, as investment is 20 to 25 percent of GDP in many OECD countries and this would require a CAB as 10 to 15 percent of GDP for all OECD countries. Even in such a case, this development would have important consequences in terms cross-border lending and asset purchases.

As a result, the puzzle does not exist at all, once it is realized that gross national saving is by definition equal to gross investment plus current account balance. In fact, the Feldstein-Horioka Puzzle was based on the discrepancy between the definition of the data and how it was interpreted. The aggregate data for gross national saving is estimated *ex post* and built on macroeconomic identities that were developed in 1953 (in accordance with the Keynesian Revolution). The concept of saving in orthodox

economics, is based on the *pool metaphor* (Blecker, 1997), and this metaphor needs a pool of *ex ante* savings in these data sources. In other words, the loanable funds or the Feldstein and Horioka puzzle would still be valid if there was *ex ante* gross national savings. And in order to evaluate this argument it is necessary to look into the definition of saving for domestic sectors, and how savings data is gathered for these sectors; these issues will be discussed in the next section.

As a third example of the how saving data is interpreted in orthodox economics, Bernanke's (2005) global saving glut argument can be discussed. In this example, low savings rates were seen as responsible for current account deficits. In a 2005 speech, the Fed's chairman Bernanke argued "global saving glut" was responsible for "the relatively low level of long-term real interest rates in the world" (Bernanke, 2005). According to him, changes in incentives to save were responsible for current account surpluses and deficits in different economies. However, as discussed above, the basic macroeconomic identity shows gross national savings by definition equal to investment plus current account balance. And countries with current account deficits will experience a decline in savings by definition, but this decline is the outcome not the cause of the events. Increasing savings cannot make an economy more competitive in international markets.

In sum, gross national saving is defined as the sum of investment and current account balance in SNA and economic data sources that uses its definition. This definition does not supply *ex ante* savings that loanable funds theory requires. Consequently, there is a logical discrepancy between data and its interpretations based on loanable funds. Defining an economic problem as 'shortage of savings,' or 'low investments and current account deficits' can lead to completely different macroeconomic outcomes. In the former, loanable funds theory would demand a reduction in –both public and private- spending which will depress investments further; in the latter a new policy would be sought to boost investment and/or to improve current account balance. It is not a coincidence countries with high savings rates have high investments and current account surpluses.

3. The Sources of Gross National Saving

The previous section shows that gross national saving data comes into existence *ex post* by using investment and current account balance data. It may still be possible to argue that even though gross national savings have been derived *ex post*, there must be an equivalent *ex ante* saving, yet undetected. In other words, economic units' decisions to spend and save must have generate sufficient savings *ex ante* and these funds must be equal to *ex post* gross national savings. In order to evaluate the validity of this argument it is necessary to look at savings of domestic sectors such as households, domestic business, and government; or in other words what these sectors actually save.

For this purpose, we will use NIPA Table 5.1 of BEA and Table F.4 of Financial Accounts of the U.S. of the Board of Governors of the Federal Reserve (BGFR).[4] In these tables, there are two different representations of gross national savings. In the first representation, as shown in Table 1, gross national saving equals to net saving plus consumption of fixed capital. And this gross national saving equals to gross domestic investment plus capital account transactions (net) plus net lending/borrowing.[5] The sum of capital account transactions and net lending/borrowing in the second column is equal to current account balance SNA (1993: 398-399). And, according to the Financial Accounts Guide (BGFR, 2016: 6) "in theory, gross saving can also be calculated as the sum of gross domestic investment, net capital account transactions, and capital account net lending (+) or net borrowing (-). In practice, however, the two calculations for gross saving differ by NIPA's statistical discrepancy."

Table 1 Here

The explanation of Financial Accounts Guide (BGFR, 2016: 6) is in line with the data reported in IMF's WEO. But unlike IMF, NIPA shows gross saving in two different ways as shown in the Figure 3 below, and the difference between these two is the statistical discrepancy.

[4] *Formerly* Flow of Funds Accounts of the U.S.

[5] In NIPA Table 5.1, capital account transactions "consists of capital transfers and the acquisition and disposal of nonproduced nonfinancial assets" (NIPA, 2016, website), and net lending/borrowing item represents "net lending or borrowing position that the United States has with the rest of the world" (NIPA, 2007: 23).

Figure 3 Here

The components of these two representations can yield a new set of information as the details are shown in Figure 4 below. The left panel of Figure 4 shows that net savings of the U.S. economy is in decline since early 1960s and turned into negative in years of 2008 and 2009 even though gross saving and investment did not show a similar pattern. Moreover, the consumption of fixed capital, an estimated value to represent depreciation, has steadily increased in the same era.

Figure 4 Here

Thus, the difference between gross and net saving is crucial. Even though, gross national saving equals to investment plus current account balance at the aggregate level, gross national saving is not what economic units *actually* save. What economic units actually save is net saving, and it is in decline (as a percentage of GDP) even though investment is not. Net savings have never been sufficient to finance investments in the U.S., and consumption of fixed capital plays an important role here. As a result, it can be helpful to look into the details of gross saving in terms of net saving and consumption of fixed capital. Net saving represents the sum of net savings of domestic business, households and government as the details are shown below:

Net Savings of

Domestic Business = Undistributed Corporate Profits (9)
+
Inventory Valuation Adjustment
+
Capital Consumption Adjustment

Households = Disposable Income – Consumption (10)

Government = Taxes – G. Spending – Transfers (11)

According to SNA, "…non-financial and financial corporations have no final consumption expenditure or actual final consumption" (SNA, 1993: 261); and for this reason, net saving is mostly undistributed profits for this sector. For household sector, net saving equals to disposable income minus consumption, and for government sector it is taxes minus government spending minus transfers. As the

above graph shows, net saving of the U.S. economy is not sufficient to cover for investments, but gross savings are equal to investment plus current account balance. As a result, consumption of fixed capital is responsible for holding the equality that macroeconomic identity requires, as CFC constitutes most of the gross national saving in the U.S.

CFC is an estimated value for depreciation; it is a major balancing item, and "is one of the most important elements in the System" (SNA, 1993: 187). CFC "…does not represent the aggregate value of a set of transactions. It is an *imputed* value whose economic significance is different from entries in the accounts based mainly on market transactions. (…) Its value may deviate considerably from depreciation as recorded in business accounts or as allowed for taxation purposes, especially when there is inflation. Consumption of fixed capital should reflect underlying resource costs and relative demands at the time the production takes place. It should therefore be calculated using the actual or estimated prices and rentals of fixed assets prevailing at that time and not at the times the goods were originally acquired" (SNA 1993: 182). In sum, the imputed value, CFC, is responsible for balancing net and gross investment.

In the U.S., BEA uses a geometric pattern to estimate the CFC, or depreciation of all U.S. fixed assets for the overall service life of assets (Fraumeni, 1997). BEA uses a table for rate of depreciation and service life of all types of fixed assets (Fraumeni, 1997: 18-19). The depreciation is high in the early years of an asset, and it declines as the asset gets older, and the depreciation shows a geometric pattern. For one dollar of investment, depreciation, $d_{t,t-i}$, of an assets is as follows:

$$d_{t,t-i} = \delta_G(1-\delta_G)^{i-1}, \quad (12)$$

$i = 1, 2, 3, \ldots,$ where i is the age of the asset.

In this equation, δ_G represents the geometric rate of depreciation, and d represents the depreciation of a physical capital in a given year. During its lifetime, an asset will lose a fraction of its value every year, and its value will become zero at the end of its lifetime.

This methodology can very accurately capture the *depreciation* or consumption of fixed capital through its lifetime, but is not an *actual saving* in terms of a saved fund. Once an investment is made, that capital asset depreciates for *n* years depending on the service life. As a result, investment data in time *t*-

n is also responsible for depreciation or consumption of capital for *n* years. It is plausible to argue that CFC makes a big portion of gross national saving data and it is an imputed value for the past years' investment data (Figure 4).

In order to find the effects of investments of past years on current CFC and gross saving we developed a simple exercise. We assumed that the average lifetime of all the physical capital in the U.S. is twenty years and randomly picked depreciation rates between 1 and 10 percent for all these capital assets. For year t, the consumption of fixed capital should be

$$CFC_t = \sum_{i=1}^{20} \frac{P_t}{P_{t-i}} I_{t-i} d_{t,t-i}, \quad (13)$$

i = 1, 2, 3, …, where *i* is the age of the asset. In this new equation, *our estimated* consumption of fixed capital in a given year is the sum of depreciations times the initial investments after adjusted for price level for the last twenty years. For example, CFC of 1972 would be the sum of the investment of 1952 times depreciation for twenty years plus the investment of 1953 times depreciation for nineteen years plus… the investment of 1971 times depreciation for one year; and all investments must be adjusted for the price level of 1972. And this exercise can be repeated for all the years in the sample. It is possible to estimate a different CFC series based on different depreciation rates, and after estimating various CFC series three of these estimated series are plotted together with the BEA's CFC for comparison.

As it can be seen in the graphs of Figure 5 below, using past years investment data can give very similar results with actual CFC even under very unrealistic assumptions, i.e. all assets have the same depreciation rate and service life. Out of these three, 8 percent of depreciation rate for 20 lifetime of physical capital gave an *estimated* value of CFC very similar to that of the BEA. The BEA is using different depreciation rates and life time for various assets, but this simple exercise can show us that CFC can be estimated by using past values of investment. As a result, the biggest component of gross saving does not depend on what economic units actually save, but on investment data of previous years. And in this sense, neither CFC nor gross national saving can be sources of funds.

Figure 5 Here

CFC is responsible for the link between net and gross savings, not the saving decisions of domestic sectors. Thus we have two different versions of gross national saving. In the first one, it is equal to investment plus current account balance; and in the second one it is equal to net saving plus CFC, and CFC is estimated by using investment. In both definitions saving data depends on investment to exist; and saving is not the outcome of certain economic transactions. Under these conditions net saving is not sufficient to finance investments in the U.S. economy.[6]

These findings show that gross national saving is different than the concept of saving as used in an economics textbook. In textbook definition, disposable income can either be spent or saved, as a result saving represents a certain amount of funds. However, gross national saving is estimated on a conceptual definition, and it does not represent a certain amount of funds. Economists often use gross national saving to test the relationship between savings and investment, growth, or current account deficits. These studies are invalid at the beginning as gross national saving is used to explain the variables that it was derived from. The issue here is not whether loanable funds theory or neoclassical growth theory is valid or not, the real issue is gross national saving cannot represent the variable *saving* that these models use, and the empirical tests of such models cannot be built upon gross national saving.

4. The Definition of Saving in System of National Accounts

After reviewing the details of saving data, a review of SNA methodology can be helpful in understanding the conceptual basis of saving. Similar to any economic data, saving data is based on the methodology of System of National Accounts of the United Nations (UN), which was first developed in 1953. Even though this methodology evolved and changed in 1968 and 1993, standard macroeconomic analyses did not follow these developments. According to Godley and Lavoie (2007: 23) SNA of 1953 had "left the monetary and financial phenomena in dark" as the focus was "saving must equal to investment." Even though this notion is valid at the aggregate level, the real issue is who finances whom, and through

[6] In order to support the loanable funds theory it can be argued that even if net saving is small, gross investment should be adjusted for consumption of fixed capital and in that case net saving and net investment could be similar to each other. However, we should remember that gross investment, not only net, should be financed.

which instruments. In SNA methodology, financial markets and institutions are not passive but active participants of an economic system. In 1968, a new SNA "provided a theoretical scheme that stressed the integration of the national income accounts with financial transactions, capital stocks and balance sheets" (Godley and Lavoie, 2007: 24), and this new system was also updated in 1993 (SNA, 1993). However, National Income and Product Accounts (NIPA) in the U.S. and similar macro data sources all around the world did not incorporate such developments into their systems. And many economists were similarly reluctant to use this new methodology in their models (Godley and Lavoie, 2007: 25). As a result, the financial transactions remained outside of the system, and these transactions were represented under saving as if saving is a black box. This approach also enabled classical dichotomy between real and monetary variables to survive (Godley and Lavoie, 2007: 24). The questions of who finances whom, and how an investment is financed are often ignored.

In SNA framework, saving can emerge for an economic unit as a negative or positive amount as a residual. And once it emerges, the next step is the direction of change it leads in terms of a change in liabilities or assets. As a result, saving, by itself, is not a constraint for an economic unit.

The SNA system "describes… economic life" as "production, income, consumption, accumulation and wealth" (SNA, 1993: 20). In this framework, the system starts with the balance sheet or stocks of an economic unit; and it is followed by income and expenditure flows, which lead to changes in stock accounts. After the changes in stocks are recorded, new balance sheet or stock accounts are formed. "The accounts are grouped into three categories: (1) Current accounts deal with production, income and use of income; (2) accumulation accounts cover changes in assets and liabilities and changes in net worth (the difference for any institutional unit or group of units between its assets and liabilities); and (3) balance sheets present stocks of assets and liabilities and net worth" (SNA, 1993: 37). In these accounts, "all current transactions make net worth vary either positively (in the case of resources) or negatively (uses). The recording of a transaction as a current resource means an increase in the amount of economic value a unit or a sector has at its disposal; conversely, a transaction recorded as a current use means a decrease in this amount of economic value" (SNA, 1993: 37).

This representation of economic activity is very similar to modern *stock-flow consistent models* in which a "monetary production economy" is represented (Godley and Lavoie, 2007: 3). In this representation, economic units are not constrained by their income as long as they can finance their positions. However, in such cases these units would be accumulating new liabilities that affect their balance sheets. Flow variables lead to a change in assets and liabilities, and net worth. SNA accounts have a similar approach, and this section will discuss how such changes take place from flows to stocks. For this purpose, we will start with the production account of SNA (Table 2). This account represents the first step of current accounts, and it records the start of flow variables. Once the output is produced and immediate consumption (of production) is used out of output, gross value added comes into existence; and as gross value added is adjusted for consumption of fixed capital, net value added remains.

Table 2 Here

Once the value added is generated, its distribution is shown in the primary distribution of income account. The value added is used for compensation of employees, taxes on production and imports. Subsidies, if there are any, is also recorded with an opposite sign. The interesting aspect of this sub-account is that the summation of these entries may be equal or different than value added. However, by definition the resources and uses of any account should be equal to each other. In that case a *balancing item* is introduced as a new entry, and in Table 3 it is *operating surplus/mixed income*.

Table 3 Here

In SNA accounts balancing items are used when *resources* and *uses* are not equal to each other. Here, *operating surplus/mixed income* is a balancing item and it appears as a *residual*. Economic units decide for the size of other entries but balancing items appear simply as the difference between resources and uses. Thus, balancing item is anything left after all the uses are considered and these items may be negative, positive or zero.[7]

[7] SNA explains these balancing items as follows:
"For units (institutional units; establishments) or groups of units (institutional sectors and, by extension, the rest of the world; industries), different sub-accounts record the transactions or other flows which are connected to some specific aspect of the

Operating surplus/mixed income can also be carried to another account as the balance of primary incomes after it is adjusted for property income, if there are any property income exist. And after this adjustment *balance of primary incomes* emerge (Table 4).

Table 4 Here

And in the secondary distribution, taxes on income and wealth, social contributions, social benefits other than social transfers in kind, and other current transfers are paid out of balance of primary incomes. After all these adjustments a new balancing item appears as *disposable income* (Table 5).

Table 5 Here

Disposable income has two uses, final consumption expenditure and adjustment for the change in net equity of households on pension funds; and after these adjustments, the remaining item is a new balancing item, i.e. *saving* (SNA, 1993: 261). Here, saving represents part of disposable income that is not spent on final consumption goods and services (Table 6). As it is a residual, it may be positive or negative depending on whether disposable income exceeds final consumption expenditure. If it is positive, the unspent income must be used to acquire assets or reduce liabilities; and if negative, some assets must have been liquidated, cash balances run down or some liabilities increased. Thus, saving provides the link between the current accounts of the SNA and the subsequent accumulation accounts. Here, saving represent the link between *flow* variables and change in *stock* variables.

Table 6 Here

Unlike a standard macroeconomic textbook representation, saving is not an end in itself in SNA; but it represents the end of flow variables and current accounts. Saving represent how accumulation accounts, or change in assets or liabilities will be affected (Table 7). In SNA "saving, being the balancing items of all current transactions/accounts is, of course, the starting element of accumulation accounts"

economic life (for instance, production). Such a set of transactions usually does not balance; the total amounts recorded as receivable and payable usually differ. Therefore, a balancing item must be introduced. Usually, a balancing item must also be introduced between the total of assets and the total of liabilities of an institutional unit or sector" (SNA, 1993: 32-33).

(SNA, 1993: 43). In this respect, saving represents changes in liabilities and net worth after adjusted for capital accounts. The saving can be negative or positive for any economic unit. In this table an economic unit's change in liabilities does not need to be equal to changes in its assets, or in other words saving does not need to be equal to investments (SNA, 1993: 261). If these two are not equal to each other, a new balancing item net lending/net borrowing can establish equality for the capital account. In other words, an economic unit can accumulate assets and/or liabilities if savings and investments differ:

"The link between the accumulation accounts and the income accounts is provided by the fact that saving - that is, disposable income that is not spent on consumption goods or services - must be used to acquire financial or non-financial assets of one kind or another, if only cash, the most liquid financial asset. When saving is negative, the excess of consumption over disposable income must be financed by disposing of assets or incurring liabilities. The financial account shows the way in which funds are channeled from one group of units to another, especially through financial intermediaries" (SNA, 1993: 3)

Table 7 Here

In the next step, SNA shows the changes in assets and liabilities following net lending/net borrowing item. Table 8 shows that financial assets and liabilities can change depending on the size of net lending/net borrowing item. These changes in financial account can be above or below savings.

Table 8 Here

As a result, the capital account show that the size of the saving is irrelevant for the uses of funds, the difference can always be financed; even with positive savings an economic unit can always invest more than its savings. In SNA, as in a modern credit economy, savings are never a constraint for spending or investment as long as new liabilities can be accumulated. Neither net nor gross saving represents a pool of funds, saving is a signal for coming changes in stocks.

SNA methodology is used in all the economic data sources, including national statistical agencies, IMF, World Bank, and OECD. Even though economists can treat saving as a pool that exists prior to

investment, the underlying principles of data collection tell us a different methodology. In SNA methodology, saving is simply a balancing item not a constraint.

As a counterargument, it can be claimed that changes in liabilities and assets must be equal to each other at the aggregate level; and saving units could be financing dissaving units. However, the equality of changes in liabilities and assets does not require that some economic units must save first to finance others. First of all, assets and liabilities can change as a result of asset prices, and changes in stocks can lead to a change in flows; for example, households can increase their borrowing as house prices increase. Secondly, credit system can endogenously create deposits by making new loans, and new assets and liabilities can increase without saving first. And all these possibilities can be shown through SNA's current and accumulation accounts, and balance sheets.

5. Conclusion

This study of saving data and SNA methodology shows that saving appears as a residual term, and it has no special meaning other than linking deficits of an economic unit and changes in that unit's balance sheet. Gross national saving is by definition investment plus current account balance, and net saving is the actual savings of domestic sectors. Gross national saving equals to investment, yet net saving is far below it, and consumption of fixed capital makes the difference between these two. Moreover, the concept of saving is a balancing item in SNA to link current accounts with accumulation accounts. Based on these three points, macroeconomics should update its understanding of saving as SNA did in 1968.

Focusing on gross national saving for macroeconomic policies can be misleading. Promoting national saving is often seen as a solution for excessive government debt, current account deficits, and promoting economic growth. However, lack of gross national saving is usually lack of investment, or current account deficits or usually both of them. Spending less cannot make a nation's goods more competitive in international markets, these issues should be addressed individually. Similarly policies designed to increase gross national saving can have opposite effects by depressing economic activities. As a result, the concept of national saving hides many macroeconomic problems.

A deficit unit, a firm or a national economy can always spend above its disposable income. Yet, it does not mean that such an economic unit can continuously increase its liabilities. Even though running a deficit may not be a problem, running chronic deficits can lead to accumulation of liabilities, and eventually creating financial instability. In a macroeconomic framework, financial positions of domestic private sectors, government and rest of the world are interdependent to each other (Parenteau, 2004; Zezza, 2009). The interaction between these sectors, and the changes in assets and liabilities of these sectors can yield more information than gross national saving.

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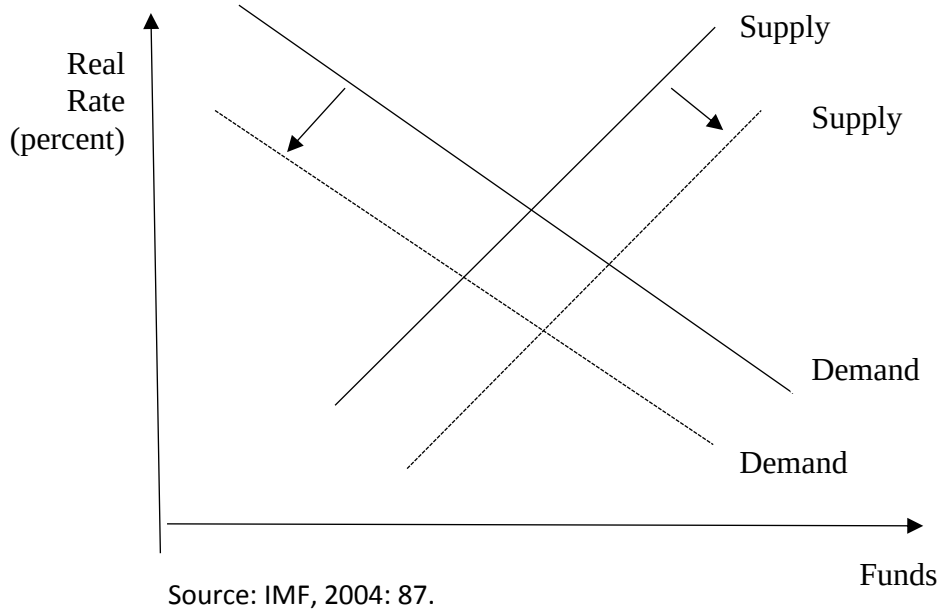
Tables and Figures

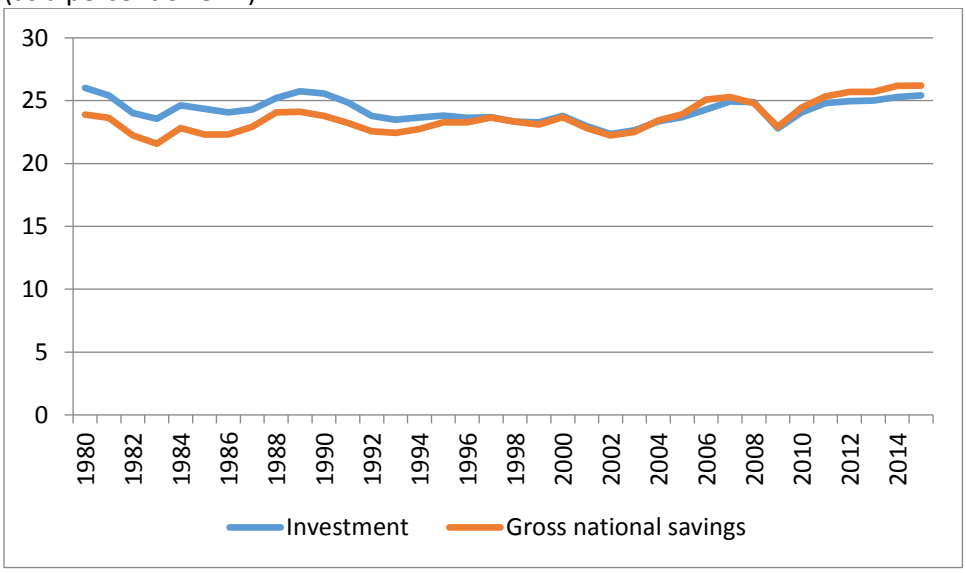
Figure 1: Loanable Funds

Real Interest Rate and Shifts Demand for and Supply of Funds



Source: IMF, 2004: 87.

Figure 2: World Investment and Saving
(as a percent of GDP)

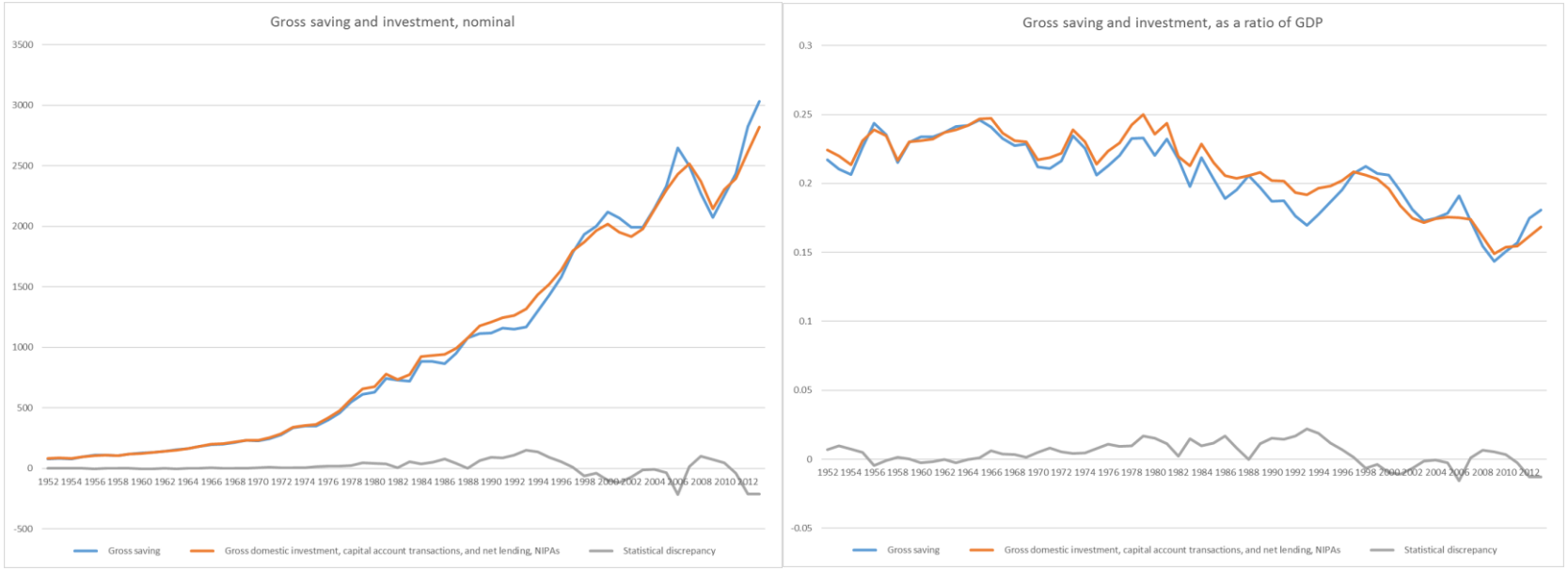


Source: IMF, World Economic Outlook

Table 1. NIPA: Gross saving and Investment

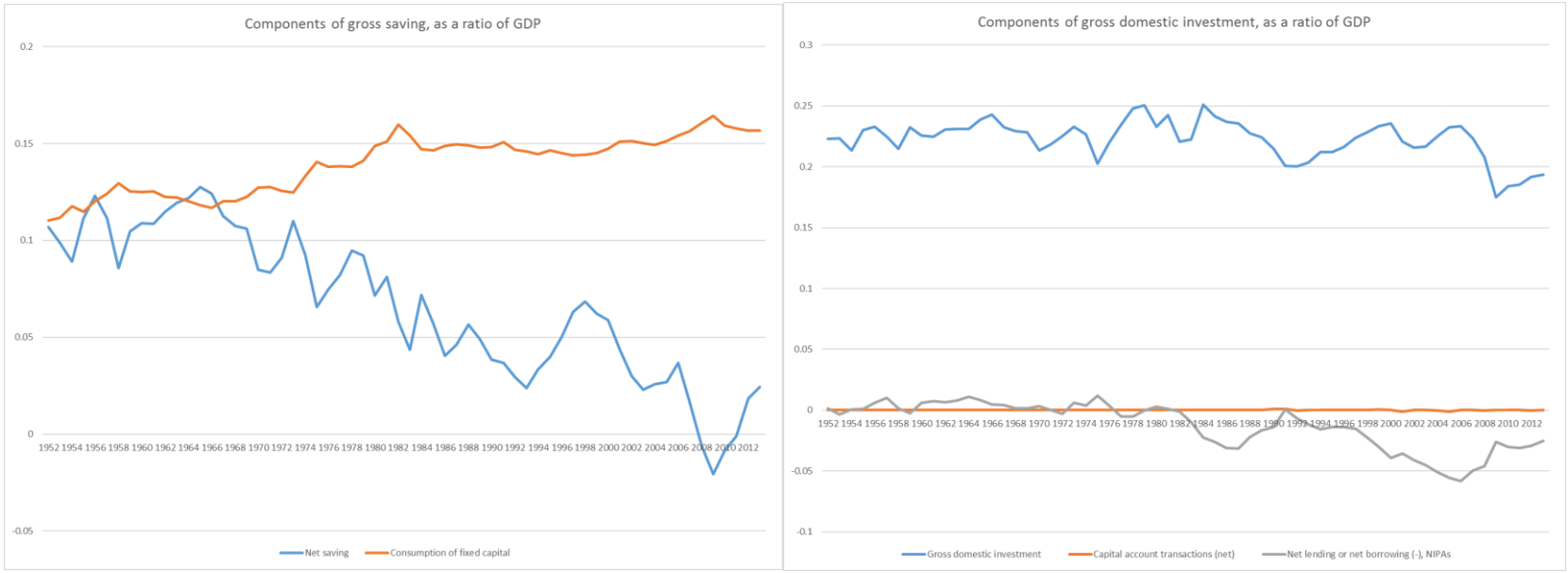
Gross saving	**Gross domestic investment, capital account transactions, and net lending, NIPAs**
Net Saving	Gross domestic investment
Consumption of fixed capital	Capital account transactions (net)
	Net lending or borrowing (-), NIPAs
Statistical discrepancy	

Figure 3. Gross saving and investment



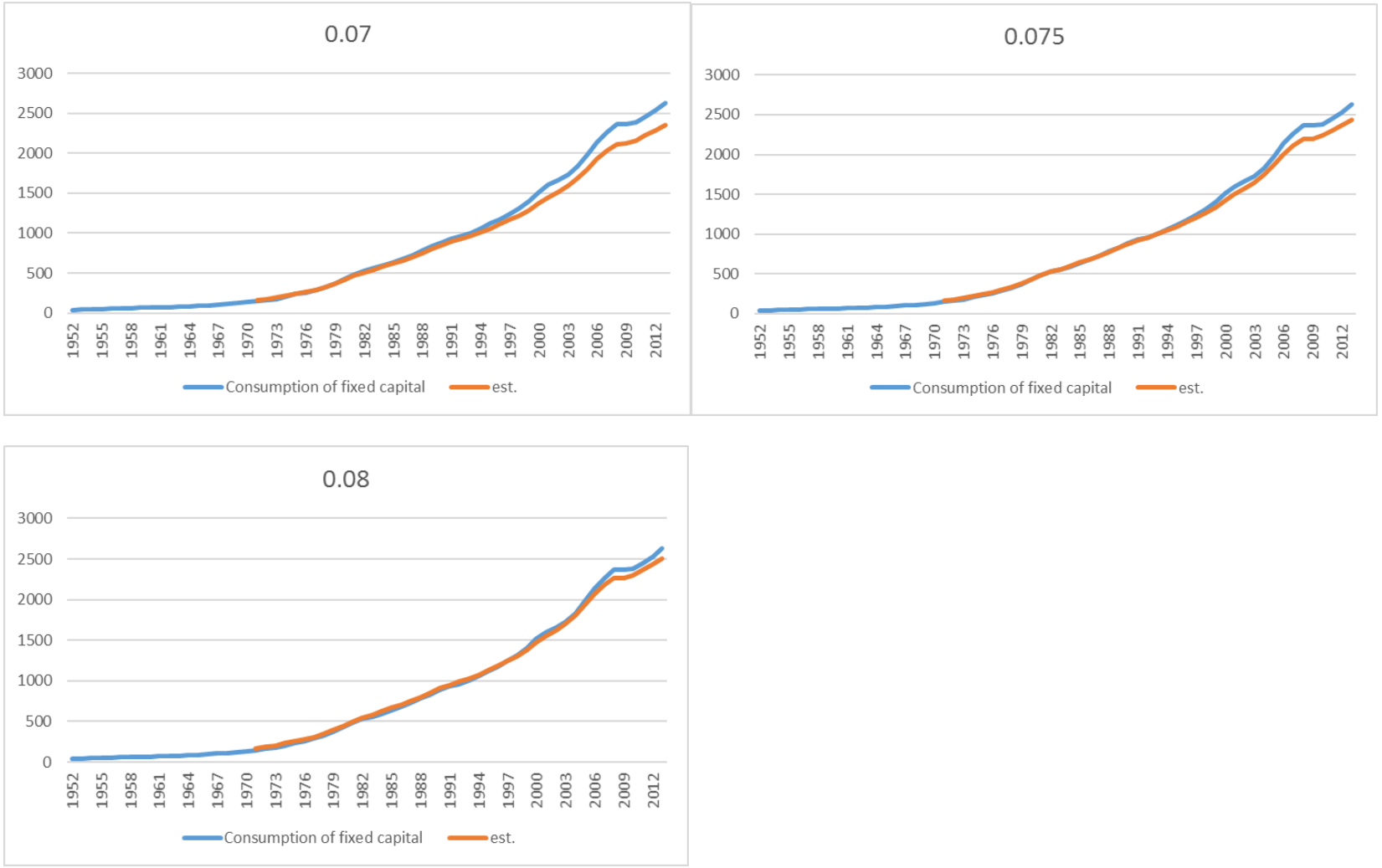
Source: NIPA, Table 5.1

Figure 4. Components of gross saving and investment



Source: NIPA, Table 5.1

Figure 5. Consumption of fixed capital[1]



[1] Consumption of fixed capital is the BEA's series, and est. is our estimation of it.
Source: Author's estimations from NIPA, Table 5.1

Table 2. Account I: Production Account

Uses		Resources	
P.2	Intermediate consumption	P.1	Output
B.1g	*Value added, gross*[1]		
K.1	Consumption of fixed capital		
B.1n	*Value added, net*		

1 For the total economy this item corresponds to gross domestic product, net domestic product respectively. It is equal to the value added of the institutional sectors plus taxes less subsidies on products.

Source: SNA, 1993: 38.

Table 3. Account II.1: Primary distribution of income account

II.1.1: Generation of income account

Uses		Resources	
D.1	Compensation of employees	B.1	*Value added*[1,2]
D.2	Taxes on production and imports		
D.3	Subsidies		
B.2/B.3	*Operating surplus/mixed income*[1]		

1 The opening and the closing balance item of this account can be expressed in gross or in net terms.

2 For the total economy this item corresponds to domestic product. It is equal to the value added of the institutional sectors plus taxes less subsidies on products.

Source: SNA, 1993: 39.

Table 4. Account II.1: Primary distribution of income account

II.1.2: Allocation of primary income account

Uses		Resources	
D.4	Property Income	B.2/B.3	*Operating surplus/mixed income*[1]
		D.1	Compensation of employees
		D.2	Taxes on production and imports
		D.3	Subsidies (-)
		D.4	Property Income
B.2/B.3	*Balance of primary incomes*[1,2]		

1 The opening and the closing balance item of this account can be expressed in gross or in net terms.

2 For the total economy this item corresponds to domestic product.

Source: SNA, 1993: 40.

Table 5. Account II.2: Secondary distribution of income account

Uses		Resources	
D.5	Current taxes on income, wealth, etc.	B.5	*Balance of primary incomes*[1,2]
D.61	Social contributions	D.5	Current taxes on income, wealth, etc.
D.62	Social benefits other than social transfers in kind	D.61	Social contributions
D.7	Other current transfers	D.62	Social benefits other than social transfers in kind
		D.7	Other current transfers
B.6	*Disposable income*[1]		

1 The opening and the closing balance item of this account can be expressed in gross or in net terms.

2 For the total economy this item corresponds to national income.

Source: SNA, 1993: 38.

Table 6. Account II.4: Use of income account
II.4.1: Use of disposable income account

Uses		Resources	
P.3	Final consumption expenditure	B.6	*Disposable income*[1]
D.8	Adjustment for the change in net equity of households on pension funds	D.8	Adjustment for the change in net equity of households on pension funds
B.8	*Saving*[1]		

1 The opening and the closing balance item of this account can be expressed in gross or in net terms.

Source: SNA, 1993: 41.

Table 7. Account III.1: Capital account

	Change in assets		Change in liabilities and net worth
P.51	Gross fixed capital formation	B.8	*Saving, net*
K.1	Consumption of fixed capital (-)	D.9	Capital transfers, receivable (+)
P.52	Changes in inventories	D.9	Capital transfers, payable (-)
P.53	Acquisitions less disposals of valuables		
K.2	*Acquisitions less disposals of non-produced non-financial assets*		
		B.10.1	*Changes in net worth due to saving and capital transfers*[1,2]
B.9	*Net lending (+)/net borrowing (-)*		

1 "Changes in net worth due to saving and capital transfers" is not a balancing item, but corresponds to the total of the right-hand side of the capital account.

2 "Changes in net worth due to saving and capital transfers" for the rest of the world refers to changes in net worth due to current external balance and capital transfers.

Source: SNA, 1993: 43.

Table 8. Account III.2: Financial account

	Change in assets		Change in liabilities and net worth
F	Net acquisition of financial assets	F	*Net incurrence of liabilities*
F.1	Monetary gold and SDRs	F.1	Monetary gold and SDRs
F.2	Currency and deposits	F.2	Currency and deposits
F.3	Securities other than shares	F.3	Securities other than shares
F.4	Loans	F.4	Loans
F.5	Shares and other equity	F.5	Shares and other equity
F.6	Insurance technical reserves	F.6	Insurance technical reserves
F.7	Other accounts receivable	F.7	Other accounts receivable
		B.9	*Net lending (+)/net borrowing (-)*

Source: SNA, 1993: 44.