# Chapter 8

# THE FINANCIAL AND BALANCE SHEET ACCOUNTS

**8** THE FINANCIAL AND BALANCE SHEET ACCOUNTS
1. The importance of household wealth for the analysis
of the current economic situation

Household final consumption expenditure accounts for 60% of GDP, so that a change of one or two percentage points in this aggregate can decide whether the economy does well or badly. The OECD economists therefore keep a close eye on the factors that influence household consumption. The most important of these is their disposable income during the period in question, but it is not the only one. Another variable influencing consumption is the change in household wealth.

## 1. The importance of household wealth for the analysis of the current economic situation

Households own financial and non-financial assets that constitute their "wealth". When the value of these assets increases due to a rise in share prices, or a rise in land values above the rise of prices of other goods and services, households feel richer and hence are more inclined to save less and spend more. It is wealth in the form of stocks that is most sensitive to these capital gains, or "holding gains" (see "Going a step further: Holding gains or losses and market prices in the national accounts"). These gains were particularly spectacular toward the end of the 1990s, thanks to the so-called new economy phenomenon. This influence on household behaviour is known as the "wealth effect". It is particularly visible in the United States, where a large percentage of households own financial wealth in the form of securities (*i.e.* stock market shares, unquoted shares, bonds and other equities).

The OECD regularly publishes indicators of the changes in household wealth. The following table, extracted from a recent publication, deals with Canada, the United Kingdom and the United States.

The figures in Table 1 are expressed as percentages of **net disposable income**, making it possible to evaluate the wealth in terms of the number of years of annual income. For example, in Canada in 2004 households' net worth was equivalent to 523.1% of their net annual disposable income, *i.e.* more than five years worth of income. The wealth comprises financial assets (bank accounts, savings accounts, stock market shares, other shares, bonds, etc.) and non-financial assets (land, housing, productive assets of individual entrepreneurs). But households also have debts (mortgages, consumer loans, etc.), and you are not truly rich if you own substantial financial wealth but at the same time have considerable debts. This is why economists look at net worth, which is equal to total assets

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## Table 1. **Household wealth and indebtedness**

As a percentage of nominal net disposable income

| | Canada | | | United Kingdom | | | USA | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1993 | 2000 | 2004 | 1993 | 2000 | 2004 | 1993 | 2000 | 2004 |
| Net worth | 459.1 | 509.0 | 523.1 | 583.0 | 727.4 | 741.3 | 490.6 | 579.5 | 557.8 |
| Net financial worth | 203.8 | 246.7 | 220.2 | 278.7 | 364.0 | 253.0 | 280.8 | 360.2 | 297.8 |
| Non-financial assets | 255.3 | 262.2 | 302.9 | 304.3 | 363.4 | 488.3 | 209.8 | 219.3 | 260.0 |
| Financial assets | 303.4 | 359.4 | 343.6 | 385.2 | 476.2 | 405.3 | 370.5 | 463.0 | 421.3 |
| Of which shares | 56.0 | 90.3 | 83.9 | 73.6 | 108.7 | 64.0 | 92.3 | 154.7 | 116.2 |
| Liabilities | 99.5 | 112.6 | 123.4 | 106.5 | 112.2 | 152.3 | 89.6 | 102.8 | 123.5 |

*Source:* OECD (2005), *OECD Economic Outlook,* December No. 78, Volume 2005, Issue 2, OECD, Paris.

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*minus* total liabilities. For example, the total financial and non-financial assets of Canadian households in 2004 came to 646.5% (302.9% + 343.6%), but after deduction of liabilities equivalent to 123.4%, the net worth was only 523.1%, well below the equivalent figure for United Kingdom households and slightly less than that of United States households.

Table 1 also illustrates the impact of the speculative bubble in the latter part of the 1990s on household wealth. In the United States, the value of shares held by households rose from 92.3% to 154.7% of disposable income in just seven years. To some extent, this increase was due to an increase in the volume of shares bought by households, but mainly it was caused by a rise in shares' prices. However, the 2001 downturn on Wall Street wiped out half the potential gains accrued between 1993 and 2000, and unrealised holding gains were just as rapidly replaced by unrealised holding losses. Stock markets have their ups and downs. This would matter less were it not for the impact on growth, notably via the "wealth effect". Fortunately, the spectacular rise in real estate prices compensated in the early 2000s for the slump in the stock market. This can be seen by the surge in non-financial wealth, for example in the United Kingdom, where it rose from 363.4% to 488.3% of household disposable income in the space of four years. It was certainly this additional non-financial wealth that enabled UK and American households to maintain their high level of consumption and low level of saving in the recent period.

The financial accounts and the balance sheet accounts in the national accounts constitute the source for the household data we have just commented on. However, the financial accounts also cover financial and non-financial corporations, and general government. These accounts make it possible to calculate not only the net worth of various groups of agents at a given moment, but also how this has evolved over time. This chapter describes the organisation of these accounts.

## 2. The principle of quadruple-entry bookkeeping

Preceding chapters have shown how the national accounts record transactions relating to production, consumption and distribution between the various institutional sectors. At the end of all these transactions, economic agents are either in a borrower situation, meaning that they have spent more than they have received, or in a lender situation, meaning that they have spent less than they have received. The financial accounts show how the borrower sectors obtain the financial resources they need, and how the lender sectors allocate their surpluses. In general, non-financial corporations are globally borrowers while households are globally lenders. Globally, means for the sector as a whole, and not unit per unit (*i.e.* many poor households are not lenders).

We shall see here, in a section in which anyone who has worked on company accounts will recognise some familiar conventions, that each transaction can be recorded twice: once as a transaction related to production, consumption, etc., and once as a monetary transaction – national accountants would say once as a **non-financial transaction** and once as a **financial transaction**. This system shows the high degree of integration within national accounts.

In our money-based societies, every transaction has as a counterpart movement of funds (except for barter transactions, which are recorded solely as non-financial transactions). National accountants say that *each non-financial transaction has a financial "counterpart".* Take a very simple example. Household H buys a television set for $300. This will be recorded as consumption of $300 in the form of a non-financial transaction. Because of the purchase, the household's bank balance is reduced by $300, the result being a reduction of $300 in the financial accounts. Every transaction by an agent therefore gives rise to two entries: one in the non-financial accounts; the other in the financial accounts, as shown in the summary T-account below.

| Accounts of household H | | | | |
|---|---|---|---|---|
| Non-financial transaction | | Financial transaction | | |
| Uses | Resources | | Uses | Resources |
| Consumption 300 | | | Reduction in bank balance 300 | |

We shall now record the same transaction, but this time from the point of view of corporation C, which sold the television set. As with the household, there are two entries, but for the corporation both entries are under "resources": one as an output among non-financial transactions; and one as an increase in the company's bank balance among financial transactions.

This means that, in total, a single transaction is recorded four times in the national accounts, hence the term quadruple-entry bookkeeping. Put another way, two entries are made for each of the two sectors involved in a transaction.

| Accounts of corporation C | | | | | |
|---|---|---|---|---|---|
| Non-financial transaction | | | Financial transaction | | |
| Uses | Resources | | Uses | Resources | |
| | Output | 300 | | Increase in bank balance | 300 |

In practice, the financial accounts are somewhat more complicated than we have just shown. For one thing, instead of recording movements in funds under uses or resources depending on whether they correspond to an increase or decrease in a bank balance, all the transactions on the bank accounts, are entered on the same side of the T-account. Moreover, the equivalent of the "uses" column is renamed "change in assets" (denoted by Δ Assets) and the "resources" column is renamed "change in liabilities" (denoted by Δ Liabilities). Our earlier example then gives the following entries:

| Accounts of household H | | | | |
|---|---|---|---|---|
| Non-financial transaction | | | Financial transaction | |
| Uses | Resources | | Δ Assets | Δ Liabilities |
| Consumption | 300 | | Bank balance | −300 |

| Accounts of corporation C | | | | |
|---|---|---|---|---|
| Non-financial transaction | | | Financial transaction | |
| Uses | Resources | | Uses | Δ Liabilities |
| | Output | 300 | Bank balance | +300 |

It will be seen that this leads to the existence in the financial accounts of transactions carrying a negative sign. For instance, the reduction of $300 in the household's bank balance is recorded as – 300 under changes in assets. This complicates things somewhat, but remains easily understandable, since a negative number indicates a decrease in the financial asset in question – in this case a decline in the bank balance. Since a given period will see numerous movements in bank accounts, some positive and some negative, the financial account will record only the algebraic (net) sum of all these movements taken together.

On the liability side, we find the debts. To complicate our example slightly more, as illustrated below, if our household had taken out a loan of $300 to pay for its television set, we would find on the "change in liabilities" side a debt increase of $300, matched by an increase in the bank balance of the household. Note that it is quite possible to find a negative number among the changes in liabilities. For example, if a household repays a debt, this will be recorded as a negative number in the right-hand column "changes in liabilities" (for a more comprehensive example, see section "Going a step further: a more complete example of entries in the financial accounts"). A final change in presentation involves placing the accounts of each agent one below the other and not side-by-side.

| Accounts of household H | | |
|---|---|---|
| Non-financial transaction | | |
| Uses | Resources | |
| Consumption | 300 | |

| Accounts of corporation C | | |
|---|---|---|
| Non-financial transaction | | |
| Uses | Resources | |
| | Output | 300 |

| Accounts of household H | | |
|---|---|---|
| Financial transaction | | |
| Δ Assets | Δ Liabilities | |
| Bank balance (money obtained from the loan taken out) | +300 | Loan taken out +300 |
| (money paid for the TV set) | −300 | |

| Accounts of corporation C | | |
|---|---|---|
| Financial transaction | | |
| Δ Assets | Δ Liabilities | |
| Bank balance | +300 | |

The T-accounts make it easier to visualise all the accounting relationships involved in the quadruple entry. We will call them "accounting identities". The *first accounting identity* is the cancelling out along the row of the non-financial transactions, with the consumption of $300 under uses matched by output of $300 under resources. In contrast to the financial accounts, there are no figures with negative signs in the non-financial accounts (although there are exceptions). However, it is valid to place a "virtual" negative sign on a transaction in the uses column and a "virtual" positive sign on a transaction in the resources column. Thus, one can place a negative sign on the consumption of $300 and a positive sign on the output of $300. This gives (–300 + 300) = 0, so the first accounting identity is respected.

If we forget the complication introduced by the loan, the *second accounting relationship* is the cancelling out along the row of the financial transactions, with the –$300 in the household's bank balance matched by +$300 in the company's bank balance: (–300 + 300) = 0.

To better visualise these two accounting relationships, one can introduce a crucial balancing item providing the link between the non-financial and the financial transactions. This is **net lending/net borrowing**, carrying the code **B9**.

The net lending/net borrowing is the balance of all the non-financial transactions. Once agents have produced their output, been paid for their work, consumed, paid their taxes, received their benefits, etc., they have either underspent their receipts, in which case they are said to have generated "net lending", or overspent their receipts, in which case they need to borrow and so are in a "net borrowing situation". This balancing item, like all similar balancing items in the non-financial accounts, is conventionally entered in the uses column and is calculated as the sum of the resources *minus* the sum of the uses. If the result is positive, there is net lending; if it is negative there is net borrowing. For the sake of simplicity in the national accounts, "net lending/net borrowing" is presented as a single item;

a positive sign is attached to net lending and a negative sign to net borrowing. The following table shows the accounts of the above example (whithout the complication of the loan) including the balancing item B9.

| Accounts of household H | | | | Accounts of corporation C | | |
|---|---|---|---|---|---|---|
| Non-financial transaction | | | | Non-financial transaction | | |
| Uses | | Resources | | Uses | | Resources |
| Consumption | 300 | | | | | Output | 300 |
| B9 Net lending/net borrowing | −300 | | | B9 Net lending/net borrowing | +300 | |
| Financial transaction | | | | Financial transaction | | |
| Δ Assets | | Δ Liabilities | | Δ Assets | | Δ Liabilities |
| Bank balance | −300 | | | Bank balance | +300 | |
| | | B9 Net lending/net borrowing | −300 | | | B9 Net lending /net borrowing | +300 |

B9 is also the balance on all the financial movements. We accordingly find the same number at the bottom of the financial transactions account, but in this case it is conventionally placed in the right-hand column and is calculated as the sum of the changes in assets *minus* the sum of the changes in liabilities. From the point of view of the financial accounts, this balancing item can be interpreted as a change in financial net worth. If an agent is in a net lending situation, this means that, other things being equal, he or she has become financially richer during the period. Note that this can be due to several different factors. The agent may either have increased his/her claims on other agents or reduced his debts, or performed a mixture of both. Conversely, if an agent is in a net borrowing situation, his/her financial net worth has decreased (leaving aside price movements and other changes in volume).

The *final accounting identity* results from the (theoretically) strict accounting identity between the balance on the financial accounts and the balance on the non-financial accounts. By definition, these two "B9s" are equal. For each of the two agents – corporation and household – this equality is respected in our example. Unfortunately, however, it is not respected in the actual national accounts tables. This is not because there are exceptions to the general rule but because the statistical sources used for the calculation of the non-financial accounts are different from those used for the financial accounts. The resulting divergence is known as a "statistical discrepancy", and its existence explains why the B9 of the non-financial accounts is sometimes coded "B9A" and that of the financial accounts "B9B" (or called "net financial transactions") so as to differentiate them. Only the general government sector has at times no statistical discrepancy between B9A and B9B, thanks partly to the quality and consistency of the information available for the accounts of this sector but also, in Europe, to the need to

produce the "cleanest" accounts possible, given that they are closely monitored by the European Commission (see Chapter 9). In the general government case, therefore, B9A is often equal to B9B.

It is essential to have a firm grasp of these *three accounting identities* to be able to record in a convincing manner certain complex operations (see Exercises 2 and 3 at the end of this chapter). An important corollary of these three accounting identities – one might even call it a theorem – is that in a closed economy (one that has no relations with the rest of the world) the sum of the net lending and the net borrowing is zero by definition. In other words, one agent's lending is necessarily another agent's borrowing (see box below "Saving and investment"). In an open economy, the sum of the net lending and net borrowing of resident agents is equal to the net lending or net borrowing of the rest of the world, but carries the opposite sign.

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### Box 1. **Saving and investment**

The basic Keynesian model taught in elementary macroeconomics classes is: $Y = C + I$; $R = Y$. These equations are to be read as follows: demand Y is equal to consumption C *plus* investment I; income R is equal to output Y, which is itself equal to demand. From this is derived the well-known equation:

$$Saving = R - C = I$$

stating the basic rule that saving equals investment. If one assumes that firms do not self-finance any of their investment and that households do not invest, this is tantamount to restating our "theorem" that the sum of agents' net lending/net borrowing is zero in a closed economy. Indeed, households save and in this way are net lenders. Firms, for their part, have to find funding for their investment. Under the simplified conditions presented here, households' net lending exactly covers, by definition, firms' net borrowing. This illustrates the convergence that exists between the national accounts model and the Keynesian model.

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It is strongly recommended that Exercise 2 be done after a first reading of this chapter. In addition to providing an illustration of these accounting identities, it will demonstrate that some transactions are purely financial, in the sense that they involve no non-financial transactions. For example, if a household sells shares only the two movements in financial assets are recorded, with no corresponding entry in the non-financial accounts.

## 3.  Financial assets and liabilities

In our very simple example, we have introduced only one type of financial asset (the bank account) and only two agents. In reality, there is a very wide variety of claims and debt and also a wide variety of institutional sectors. In particular, there is considerable detail in

the financial accounts regarding the different categories of *financial* corporations. The complete list of these financial subsectors is given in Chapter 10.

The entire scope of the information provided by the financial accounts can be seen by referring to the "table of financial transactions" (also called "flow of funds") toward the end of this chapter. However, before going into all these details, it is useful to start with a stylised presentation of the financial accounts, to show that things are not as complicated as they look in the detailed table.

### Stylised presentation of the financial accounts

| | Assets | | Liabilities | |
| --- | --- | --- | --- | --- |
| | Financial institutions (FI) | Non-financial agents (NFA) | Financial institutions (FI) | Non-financial agents (NFA) |
| Deposits | | W | W | |
| Loans | X | | | X |
| Interbank refinancing | Y | | Y | |
| Securities | Z1 | Z2 | Z3 | Z4 |

In this stylised presentation, we have indicated by capital letters the cells in the table where the bulk of the transactions and the major accounting equalities are to be found. As the presentation shows, the financial accounts trace out the assets and liabilities and the changes in these taking place between the *financial institutions* (mainly banks) and the *non-financial agents* (households, corporations, general government). The principal financial assets are shown in the left-hand column: *deposits* (including bank accounts), *loans* (*i.e.* bank loans to corporations and households), *interbank refinancing* (all the transactions between banks that are necessary for the financial system to function properly) and *securities* (bonds and shares).

For example, the deposits (W) are assets for the non-financial agents and liabilities for the financial institutions, and the total of the one is equal to the total of the other. The loans (X) are mainly assets for the financial institutions and liabilities for the non-financial institutions, and again the two totals are equal. The amounts involved in interbank refinancing (Y) are sometimes astronomical, but it will be seen that this is in fact internal to the financial sector, with roughly the same amounts recorded as assets and liabilities. Only the securities (Z) are recorded on both the assets and liabilities sides for virtually all the institutional sectors. The exception is the household sector, since households do not issue securities. As for other lines, total securities issued (Z3 + Z4) equals total securities acquired (Z1 + Z2).

There are in fact many more columns and rows in the real table of financial transactions in the national accounts. In particular, financial assets are broken down by their degree of "liquidity" (a financial term measuring the rapidity and facility with which an asset can be transformed into cash or another generally accepted means of payment: a bank

account is highly liquid, but a share is less liquid because it first has to be sold, requiring payment of a commission). The following is the list of the principal financial assets recorded in the national accounts. The list of financial liabilities is identical, since one agent's financial asset is necessarily another agent's liability (see box "Tricks of the trade").

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### Box 2. **Tricks of the trade: how to distinguish a financial asset from a non-financial asset**

A financial asset for one agent always is a corresponding liability for another agent. For example, a bank account is an asset for a household and a liability for the bank. Banknotes are assets for those who own them and a liability for the central bank that issues them. A loan is an asset for the lender and a liability for the borrower, and so on. The only exception to this rule is "monetary" gold held by central banks. Non-financial assets, on the other hand, have no identifiable counterpart. If a household owns a dwelling, this appears among its assets, but it is no one's liability. A firm owns a machine that appears among its assets but no other agent has a corresponding liability.

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The list of financial assets is as follows:

1. F1 – Monetary gold and SDRs. This item usually only concerns central banks. It reflects the gold held as a monetary reserve by a central bank *plus* Special Drawing Rights. SDRs are special assets created by the International Monetary Fund and held by central banks. There are two exceptions: in the United Kingdom, F1 is recorded for the sector S1311 (central government), while in the United States, it is split between S121 (central bank) and S1311 (central government).

2. F2 – Currency and deposits. This item includes "currency", code F21 (which is an asset for the holders and a liability for the issuers, mainly central banks). It also includes "transferable deposits", code F22, which includes current bank accounts, as well as "other deposits" (F29). Item F2 does not exactly correspond to the so-called monetary aggregates (see section "Going a stage further: financial accounts and money supply").

3. F3 – Securities other than shares. This item is broken down into two sub-items: F33 "securities other than shares, except financial derivatives" and F34 "financial derivatives". Item F33 is sub-classified by maturity into short-term and long-term and includes, in particular, the securities issued by the public treasury to finance the public deficit. It also includes all other bonds, including those issued by corporations. Item F34[1] "financial derivatives" is a large item but is almost exclusively concerned with interbank refinancing. The description of financial derivatives is somewhat too technical for this textbook.

4. F4 – Loans. This item contains all the financial assets that are created when creditors lend money directly to debtors. This item includes consumer loans, housing loans and loans to businesses. Like item F3, it is broken down into two sub-items: short-term

loans (for less than one year) and long-term loans (for more than one year). This breakdown has its limitations. For one thing, loans are now sometimes renegotiable. For another, a long-term loan nearing the end of its life becomes a short-term loan.

5. F5 – Shares and other equity (including shares issued by investment funds, such as mutual funds). This item includes shares in both quoted and unquoted companies. How to value the latter is the Achilles' heel of financial national accounts. It is in fact very difficult to estimate what their market price would be, since by definition there is no market for them. Note, moreover, that shares are shown as liabilities of corporations in the national accounts, even though they are not a debt of companies but form part of their "own funds". Shares in investment funds are shares held indirectly, through portfolios managed by banks and financial corporations (including property portfolios). This item is increasingly important, since households apparently prefer this type of product to direct holding of shares and bonds.

6. F6 – Insurance technical reserves. This item is broken down between F61 "net equity of households in life insurance reserves and in pension fund" and F62 "prepayments of insurance premiums and reserves for outstanding claims". In terms of holdings, item F61 represents the cumulative value of the savings invested by households in life insurance contracts and in capitalisation pension funds. The value of these assets is attributed to households in the national accounts, despite the fact that these assets in company accounting appear in the balance sheets of the companies managing these funds. This attribution is a correct representation of economic reality, since the savings belong to the households and not to the companies managing them. Indeed, at some stage, these sums will be returned to the households in the form of annuities or retirement pensions. The implicit debts of the pension plans known as "pay-as-you-go" (often social security or civil service pension plans) are not recorded in the national accounts, although there is a debate among national accountants on this point. For the time being, the institutional differences among countries regarding pension plans (capitalisation *versus* pay-as-you-go) generate very significant differences in the financial accounts, making international comparisons difficult. In particular, pension assets (in other words, future pension rights) in countries with mainly capitalisation systems are recorded as households' assets, while the value of future pension rights in countries with pay-as-you-go public systems (like France, Germany, Italy and Spain) are not recorded. Item F62 represents the prepayments of non-life insurance premiums and outstanding claims on insurance companies.

7. F7[2] – Other accounts receivable/payable. This item contains two sub-items: F71 "trade credits and advances" and F79 "other accounts receivable/payable, except trade credits and advances". The first of these is a substantial item, which includes credits related to commercial transactions (in France, for example, payments between firms for goods and services are frequently on a 60-days basis, meaning that the seller delivers the product while accepting payment 60 days later). The second sub-item includes, in particular, all the implicit credits relating to wages and salaries, taxes, rents,

etc. The national accounts record transactions on the basis of "accrual accounting", as do company accounts. This means that a transaction must be recorded in such a way that the accounts reflect at any moment the value of agents' entitlements and obligations. For example, even if an employee's salary is paid two or three months late, the salary will be entered in the month during which the work was carried out, because this is when an obligation to pay was generated by the employer. Since the salary is entered but has not been paid, there is a claim by the employee on the firm, which is entered in item F79. A similar entry will be made for tax due to the government but not yet paid.

## 4. The link between financial flows and financial stocks

As was pointed out at the beginning of this chapter, the purpose of financial accounts is mainly to provide figures on the net worth – *i.e.* assets *minus* liabilities – of institutional sectors. The stock of assets and liabilities is recorded at a given moment in time. In the national accounts, this is usually 31 December, but there are also quarterly financial accounts. Take the example of a UK household H, which on 31 December of year A, has £2 000 in its bank account, owns £13 500 of shares and £23 000 of bonds, while its short-term debts amount to £3 500 (consumer credit) and its long-term debts to £7 500 (mortgages).

### Stocks of assets and liabilities at 31/12/A

| Assets | |
|---|---|
| F2. Currency and deposits | 2 000 |
| F5. Shares | 13 500 |
| F3. Securities other than shares | 23 000 |
| **Liabilities** | |
| F41. S-T Loans | 3 500 |
| F42. L-T Loans | 7 500 |

Starting with this situation at 31/12/A, let us suppose that a household performs the following series of financial transactions during year A + 1. It spends £35 000 on consumption, receives £37 000 in wages and salaries, sells £6 500 of shares and repays £1 500 of its short-term debt and £2 500 of its long-term debt. These transactions (*i.e.* these financial *flows*) will be traced out in the financial accounts, as movements between two financial stock situations).

Financial flows are recorded at the prices actually paid, *i.e.* in current pounds sterling. In the case of transactions using payment instruments denominated in other currencies (euros, dollars, yen, etc.) and transactions in shares and bonds, whose market prices are subject to change, the actual prices at the time of sale or purchase and the currency rates prevalent on the day of the transaction are applied.

## Financial accounts for the year A + 1

|  | Δ Assets | During A + 1 |
|---|---|---|
| F2. Currency and deposits |  | −35 000 |
|  |  | +37 000 |
|  |  | +6 500 |
|  |  | −1 500 |
|  |  | −2 500 |
|  |  | = 4 500 |
| F4. Shares |  | −6 500 |
| F3. Securities other than shares |  |  |
|  | Δ Liabilities | During A + 1 |
| F41. S-T Loans |  | −1 500 |
| F42. L-T Loans |  | −2 500 |

One would be forgiven for thinking that the situation at 31/12/A + 1 would therefore be equal to the situation at 31/12/A *plus* the movements carried out during year A + 1. However, this is only approximately the case, since it does not allow for the impact of changes in asset prices. Applying the general principles of the national accounts, financial (and non-financial) stocks of assets and liabilities are valued at the market prices ruling on the day the accounts are drawn up, usually on the 31 December. But market prices of shares and bonds change (for example, the value of a bond changes in inverse proportion to changes in interest rates – see "Going a step further: The valuation of assets and its relationship to economic theory"). The value of an asset held by an agent can therefore change between 31/12/A and 31/12/A + 1, even in the absence of any transaction carried out by the agent, simply through the operation of price changes on the market, leading to holding gains in the case of upward movements and holding losses in the case of downward movements.

Returning to the example of our household, let us suppose that the average price of the shares it owns falls by 20% between 31/12/A and 31/12/A + 1. One can also suppose that it was in anticipation of this fall that the household sold a substantial portion of its shares (let us assume that this took place at the very beginning of the year, before the price fall, so as to simplify matters). A household will therefore have suffered a holding loss of 20% on the remaining £7 000 held in shares, *i.e.* a loss of £1 400. Let us at the same time suppose that the bond portfolio of the household consists of 6% Treasury bonds and that during the year the market rate of interest on Treasury bonds fell to 4%. In this case, the market value of the bonds will have risen (see Exercise 4 for the calculation of bond values). Let us suppose that this produced a holding gain of £3 200. All these changes in the price of assets are recorded in a special account known as the "revaluation account". Because on the asset side the cash holdings (or on the liability side the loans) are not subject to revaluation, no revaluations are required for these items.

### Revaluation account for year A + 1

| | Δ Assets | *During A + 1* |
|---|---|---|
| F4. Shares | | −1 400 |
| F3. Securities other than shares | | +3 200 |

We are now in a position to find the value of the financial holdings at the end of period A + 1, which equals the initial stock at end of year A (or at the beginning of year A + 1), *plus* the flow of transactions in assets or liabilities during the year *plus* the revaluations. For example, the amount of shares at 31/12/A + 1 is equal to £13 500 (stock at 31/12/A) *minus* £6 500 (sales of shares) *minus* £1 400 (holding losses on the remaining shares), which gives £5 600.

| | Financial Assets and liabilities **31/12/A** | Financial transactions **During A + 1** | Revaluations **During A + 1** | Financial Assets and liabilities **31/12/A + 1** |
|---|---|---|---|---|
| **Assets** | | | | |
| F2. Currency and deposits | 2 000 | 4 500 | | 6 500 |
| F5. Shares | 13 500 | −6 500 | −1 400 | 5 600 |
| F3. Securities other than shares | 23 000 | | +3 200 | 26 200 |
| **Liabilities** | | | | |
| F41. S-T Loans | 3 500 | −1 500 | | 2 000 |
| F42. L-T Loans | 7 500 | −2 500 | | 5 000 |

This example presents the complete information available for households in the financial accounts (with the exception of a special account called "*other changes in volume*", see below). The complete financial accounts show the financial flow, revaluation and financial stock accounts for all the institutional sectors – households, corporations, general government, and NPISHs. As might be expected, they are particularly detailed for the financial corporations, which play a critical role in the management of financial relations and constitute the prime statistical source for the financial accounts.

The complete financial accounts are in three parts. First, there are the financial flows, which are brought together in the table "Flows of Funds" (FoF). An example of this table is given at the end of this chapter, for Spain and extracted from an OECD publication. This shows the financial transactions of general government, corporations (in particular, financial corporations) and transactions with the rest of the world (corresponding to the financial account of the balance of payments). Next, there are the revaluation accounts (and the accounts showing other changes in assets) and, finally, the financial balance sheet accounts, which show the stocks. These financial stock accounts are themselves part of the balance sheet accounts described in the final section of this chapter.

Taken together, these tables show for each institutional sector the details of the financial counterpart of its net lending/net borrowing and the composition of its financial net

worth. Conversely, for a given financial asset – shares, for example – it is possible to know the net issue flows and the purchasing sectors, and finally, in the stock accounts, the total value of the shares issued in the economy and the sectors holding these shares. The financial accounts are drawn up mainly on the basis of financial corporations' published accounts (central bank, banks, financial intermediaries – see section "Data sources").

## 5. The non-financial assets

The net worth of the various agents, and especially of households, is not made up solely of *financial* assets and liabilities but also includes *non-financial* assets. For the household sector, non financial assets include dwellings and in some countries assets in the form of housing are greater than households' financial assets. Many households prefer to put their savings into "bricks and mortar". Households' non-financial assets also include the plant and equipment and the software owned by individual entrepreneurs (who are classified in the household sector).

The national accounts list a wide variety of non-financial assets: buildings and other structures; machinery and other equipment; inventories; valuables; land; mineral deposits; non-cultivated biological resources; reserves of water whose ownership can be established and transferred; and certain intangible assets (software, patents, licences, assignable contracts). One curious feature is that the national accounts distinguish between the value of land and the structures built on this land, although in practice the two are indivisible.

However, the definition of assets in the SNA is restricted to "*assets functioning as a store of value over which ownership rights are enforced by institutional units, individually or collectively, and from which economic benefits may be derived by their owners by holding them or using them over a period of time*." This definition excludes, for example, the so-called human capital, as discussed in the section "Limitations of the national accounts: The exclusions from the balance sheet accounts".

The value of non-financial assets (also called **capital stock**) is usually estimated by the *perpetual inventory method* (PIM). The PIM method is based on data for past flows of GFCF in volume and applies the simple principle that today's stock is equal to what was previously invested *minus* what has since been used up. Applying assumptions regarding physical deterioration and decommissioning, this method is therefore based solely on very long series of GFCF that are, in principle, available to the national accountants. Each annual investment is an addition to the stock, while each decommissioning (retirement from the stock of capital) or element of physical deterioration (consumption of fixed capital) is a deduction.

Using this method, it is possible to calculate the gross (or net) stock of fixed capital at the end of period n, with GC(n) then being equal to the gross (or net) stock of fixed capital at the end of the previous period GC(n – 1) *plus* the GFCF in period n, GFCF(n), *minus* the decommissioned items DEC(n) (or, respectively, the consumption of fixed capital CFC(n)).

This gives, for the gross capital stock: $GC(n) = GC(n-1) + GFCF(n) - DEC(n)$, and, for the net capital stock: $NC(n) = NC(n-1) + GFCF(n) - CFC(n)$. Measured in this way, the *net capital stock* is the market value of the stock of fixed assets and is a major component of the net worth of the nation and of the institutional sectors that own these assets. The *gross capital stock* does not have any clear economic meaning: it has been sometimes used in estimates of the production function (see introduction to Chapter 4) but most economists now use measures of capital services for this purpose rather than the capital stock whether on a net or gross basis.[3]

By developing these formulae, it can be seen that the stock of capital is a function of past investment, decommissioning and physical deterioration. If the series for past GFCF is sufficiently long, the initial GC or NC is no longer of any importance, since at the end of a finite time all the initial assets will have been retired from the capital stock. Everything depends, however, on the estimations of DEC(n) and of CFC (n), which are themselves based on assumptions relating to the average service lives of different kinds of assets, "mortality functions" which describe the distribution of decommissionings around these averages, and physical deterioration (also known as "wear and tear"). OECD countries use several different types of mortality functions. Many European countries use a log-normal mortality function while other OECD countries prefer Weibull or Winfrey functions. Physical deterioration is usually assumed to be "straight-line" meaning that it occurs in equal amounts over the lifetime of the asset, although some countries, including the United States, assume that it occurs at a constant rate. Estimates of the average service lives of different kinds of assets are clearly very important in applying the PIM. In certain countries, these parameters are derived from a survey of enterprises. The following are examples in the case of France: it has been estimated that IT hardware has an average service life of five years; transport equipment between seven and 15 years; a building 25 years and public infrastructure 60 years. On the basis of these assumptions, one obtains discard rates $D_i$, such that $DEC(n) = \Sigma_i GFCF(n-i) \cdot D_i$. The rates of consumption of fixed capital $C_i$ are calculated as a linear smoothing of these past discard rates, and this gives $CFC(n) = \Sigma_i GFCF(n-i) \cdot C_i$. Taken together, this makes it possible to calculate the stocks of capital GC(n) and NC(n) in volume. The same formulae are then used, but with the introduction of price indices, to obtain the stock of capital at current prices and the consumption of fixed capital at current prices.

## The balance sheet accounts

The balance sheet accounts are a synthesis of the tables of financial and non-financial stocks for the various institutional sectors. They make it possible to see in a single table all the assets and liabilities of each sector and hence measure the total wealth of macroeconomic agents at a given date (generally 31 December). The estimates are made at market prices and hence provide the best measure of this wealth (even though it is potential because unrealised) at this date. The estimation of this wealth is nevertheless

limited to the items that the national accountants consider as eligible to be considered as assets or liabilities (see section "Limitations of the national accounts").

The following is a summary model of the balance sheet account that we shall use to introduce the definition of "net worth", which is the most all-embracing heading in the national accounts.

**Simplified balance sheet account at 31/12/A for a given sector**

| Assets | | Liabilities | |
|---|---|---|---|
| Non-financial assets | NFA | Net worth (including shares and other equity) | C = A − L |
| Financial assets | FA | Liabilities (excluding shares and other equity) | L |
| Total | A = NFA + FA | Total | A |

As the table shows, the net worth of an institutional sector is equal to the total assets A (financial assets FA and non-financial assets NFA) *minus* total liabilities L (excluding shares and other equity appearing under liabilities). Since households have no shares on the liability side of their accounts, the net worth in their case is equal to assets *minus* liabilities. In the case of corporations, the net worth includes shares, because the recording of shares in the liabilities column is conventional and does not mean that the corporations owe these sums. In other words, shares are not debt of the companies. By their nature, holders of shares (households or other corporations) cannot demand their repayment from the company as long as the latter remains in activity. Shares appear in the liabilities column but form part of the "own funds" of the companies, hence their inclusion in their net worth.

One sometimes hears mention of *financial* net worth. This is a net worth figure but limited in scope to financial assets and liabilities and taking no account of non-financial assets. This is a somewhat narrow concept, since non-financial assets play just as important a role as financial assets in agents' behaviour.

The tables in the balance sheet accounts make it possible to explain how the net worth is created, in other words the way in which the stock of net worth at the end of a given period is arrived at from the stock of net worth at the end of the previous period. Changes in stocks can be due to several factors.

1. Consumption of fixed capital: this measures the physical depreciation and the obsolescence of the non financial assets.

2. Actual changes in non-financial and financial assets: these are made up of gross capital formation in the case of non-financial assets, and for financial assets, of the financial account flows described earlier.

3. Revaluations: these measure the holding gains or losses during the period that have affected assets and liabilities held by the sector under review.

4. Other changes in volume: This account covers exceptional transactions, generally of non-economic origin, that can affect the wealth of an institutional sector. For example, the destruction of buildings as the result of a natural catastrophe or a war is recorded negatively in this item; the discovery of new exploitable oil reserves will also be recorded there but this time positively. This item is also the place where the effects of changes in the sectoral classification of certain units will be recorded.

Taken together, these changes lead to the table on balance sheet accounts as shown at the end of the next section.

## 6. The complete sequence of accounts of an institutional sector

We are now in a position to visualise the entire set of accounts of an institutional sector (corporations, for example) right through from the production account to the balance sheet account, using the simplified diagram set out below. Note the organisation of the accounts in "T" form, with the early tables showing uses on the left and resources on the right and subsequent financial tables showing "changes in assets" on the left and "changes in liabilities" on the right. Last comes the balance sheet account in the very compact presentation we have just seen.

| | Uses | Resources |
|---|---|---|
| *Production account* | P2. Intermediate consumption | P1. Output |
| | B1. Value added, gross | |
| | | |
| *Generation of income account* | D1. Compensation of employees | B1. Value added, gross |
| | D29. Other taxes on production (*minus* subsidies) | |
| | K1. Consumption of fixed capital | |
| | B2N. Operating surplus, net | |
| | | |
| *Distribution of income account* | D4. Property income | B2N. Operating surplus, net |
| | D5. Current taxes on income, wealth, etc. | D4. Property income |
| | D6. Social benefits (from employers) | D6. Social contributions (by employers) |
| | D7. Current transfers | D7. Current transfers |
| | B8N. Saving, net | |

|  | Uses | Resources |
|---|---|---|
| *Capital account* | P5. Gross capital formation | B8N. Saving, net |
|  | K1. Consumption of fixed capital (with a minus sign) | D9. Capital transfers |
|  | B9A. Net lending/net borrowing |  |
|  | Δ Assets | Δ Liabilities |
| *Financial accounts* | F1. Monetary gold and SDRs [*] | F1. Monetary gold and SDRs |
|  | F2. Currency and deposits | F2. Currency and deposits |
|  | F3. Securities other than shares | F3. Securities other than shares |
|  | F4. Loans | F4. Loans |
|  | F5. Shares and other equity (including investment funds) | F5. Shares and other equity (including investment funds) |
|  | F6. Insurance technical reserves |  |
|  | F7. Other accounts receivable | F7. Other accounts payable |
|  |  | B9B. Net lending/net borrowing |

\* "Monetary" gold and SDRs will appear only for central banks or similar institutions.

| Balance sheet accounts | Stock at 31/12/ previous year | *Minus* Consumption of fixed capital | *Plus* GFCF for non-financial assets *or plus* financial transactions | *Plus* Revaluations | *Plus* Other changes in volume | = Stock at 31/12/ current year |
|---|---|---|---|---|---|---|
| Financial assets |  |  |  |  |  |  |
| Non-financial assets |  |  |  |  |  |  |
| Liabilities in the form of shares |  |  |  |  |  |  |
| Liabilities (excluding shares) |  |  |  |  |  |  |
| Net worth (including shares) |  |  |  |  |  |  |

## Notes

1. The classification code for this item will be changed to F7 in 2012.

2. The classification code for this item will be changed to F8 in 2012.

3. For further details see OECD (2001), *Measuring Capital, an OECD Manual: Measurement of Capital Stocks, Consumption of Fixed Capital and Capital Services,* OECD, Paris.

# Key points

▶ Generally speaking, in the national accounts a transaction by an agent is recorded twice: once in the non-financial accounts and once in the financial accounts. However, when the transactions are purely financial, they are recorded twice in the financial accounts, and in this case without any impact on net lending/net borrowing.

▶ Since a transaction involves two agents, it is therefore recorded four times, *i.e.* two entries for each agent.

▶ The financial accounts trace out first the flows and then the stocks of agents' financial assets and liabilities. The balancing item of the flows is item B9B "net lending/net borrowing"; the balancing item of the stocks is the financial net worth.

▶ If an agent is in a net lending position, his financial net worth, ignoring revaluations and other volume changes, has risen during the period. If he is a net borrower, his financial net worth has diminished (again ignoring revaluations and other volume changes).

▶ The item B9B (net financial transactions) is in theory equal, by definition, to the balancing item of the non-financial accounts, *i.e.* item B9A. In practice, there is a difference between the two, called "statistical discrepancy".

▶ Theorem: in a closed economy, the sum of the B9 items for various agents is zero.

▶ The balance sheet accounts give an estimate of the net worth of the institutional sectors at a given date

▶ Stocks and flows of financial and non-financial assets and liabilities are valued at market prices (the prices prevalent on the day the accounts are drawn up in the case of the financial stocks, and the prices prevalent on the date of the transaction in the case of financial flows).

▶ Two successive evaluations of financial stocks will differ by the intervening flows, revaluations and other volume changes.

▶ The net worth of an institutional sector is equal to total financial and non-financial assets, *minus* liabilities (excluding shares and other equity, in the case of corporations). This is the broadest measure of the net wealth of institutional sectors at a given date.

# Going further

## Holding gains or losses and market prices in the national accounts

The prices of the assets held by households and corporations vary over time. Share prices can rise and fall on the stock market, just as prices of buildings and dwellings vary in response to the law of supply and demand and the current business climate. When the prices of assets held by economic agents rise, the agents concerned have a holding gain; when they fall they have a holding loss. A distinction is made between "unrealised" gains and losses and "realised" gains and losses. A typical unrealised gain or loss occurs when the price of a share held by an agent changes but when the agent has not yet sold his holding. By contrast, realised gains and losses result from the sale of the shares (or of dwellings). The agent has then received the proceeds of the holding gain (which is in most cases subject to tax). His unrealised gain has then become a realised gain. However, national accountants are only interested in the unrealised holding gains, partly because economic agents feel richer when the prices of their assets rise, whether they sell them or not. In any case, the realised holding gains are difficult to measure.

The prices at which assets (and liabilities) are valued in the national accounts are the prices on the day in question (generally 31 December). This is the rule for both financial and non-financial assets and liabilities. The difference between the opening value (1 January) and the closing value twelve months later (31 December) therefore includes the holding gains and losses. These are recorded in the national accounts, and the data can be used by economists to calculate the "wealth effect". However, these changes in value are not recorded in the income account but in a special "revaluation account" that comes after the income account in the sequence of accounts. As a consequence, these holding gains and losses, whether unrealised or realised, do not affect the measurement of agents' income in the national accounts, in contrast to the practice adopted for company accounts. In the national accounts, agents' incomes come almost entirely from output and from the redistribution of the proceeds of this output, and not from holding gains. This convention has its advantages. It avoids introducing into the measurement of income an element that is volatile and may be only potential. It also has disadvantages. Agents modify their behaviour in light of holding gains. In fact, as they see it, there is no real difference between a realised capital gain and, for example, income from labour, apart from the fact that it is less predictable (although some salaries and entrepreneurial income can also be difficult to predict). Moreover, there is a certain contradiction in the national accounts in that the tax on realised capital gains is deducted from disposable income,

whereas the capital gain on which the tax is based is not itself part of this disposable income.

The systematic valuation in the national accounts of assets and liabilities at market prices is also open to discussion. For one thing, this "wealth" may be only potential. For example, the mere suggestion that a large holder of shares in a firm might dispose of his holding can lead to a fall in the price of the shares capable of reducing this same holder's potential realised holding gain. Much the same is true of the sale of property by a large institutional owner (an insurance company or a bank). For this reason, company accountants are more cautious than national accountants and apply the principle of valuation at the purchase price (except in the case of some quoted shares, for which the potential holding gain is practically certain to become a real gain). This caution leads to difficulty in interpreting total assets and liabilities in company accounts. These totals do not reflect economic reality since they add together assets or liabilities valued at very different dates. This difference in relation to the national accounts makes it difficult to use company balance sheets in the calculation of the balance sheet accounts. However, it is possible that the two sets of accounts could come into line in the near future with the application of the principle of "fair value" in company accounts. This "fair value" puts the prices at which valuation is made on the same footing as in the national accounts. This new approach is being recommended by the International Accounting Standards Board.

A final detail regarding valuation prices for financial assets is that they exclude taxes, fees and expenses, unlike the prices of non-financial assets, which include all of these. In both cases, the fees and expenses correspond to payment for a service. In the case of financial assets, the service is explicitly consumed as such; in the case of non-financial assets, it is consumed in the form of a capital good, since it is included in the price.

## A more complete example of entries in the financial accounts

Another example than in the Section 2 of this chapter can be used to illustrate the difference between uses/resources entry and entry as "change in assets/change in liabilities." Suppose that an agent (for example, a bank) in a given period borrows 100, repays 20 on a previous borrowing, lends 50 and is repaid 10 on loans made earlier.

With uses/resources recording, this would give:

Resources: 110 (100 + 10)

Uses: 70 (20 + 50)

This is because the agent receives 100 through borrowing and 10 from the repayment of the loan, resulting in resources of 110. It pays out 20 in loan repayment and lends 50, resulting in uses equal to 70.

But the recording in the national accounts will be as follows:

Change in assets: 40 (50 – 10)

Change in liabilities: 80 (100 – 20)

Let us see how to interpret the figures in the national accounts. The agent lends 50 and so increases his assets in the form of loans made. He receives a repayment of 10 on an earlier loan, which reduces the value of his assets because the earlier loan has been reduced by the amount of this repayment. He borrows 100, which will increase his liabilities in the form of loans. He repays 20, which reduces his liabilities since he now owes 20 less.

Only the figures in the national accounts give real information regarding the situation in terms of assets and liabilities, in other words on the change in the agent's financial wealth. This is in contrast to the analysis simply in terms of uses/resources, which merely records the agent's cash position.

## Financial accounts and money supply: the example of the euro area

One often hears of "the money supply", defined more or less broadly as the aggregates known as M1, M2 or M3. These "M" aggregates correspond to progressively broader definitions of money as explained below. Currently, in the euro area, only the money supply of the area as a whole has any economic significance (Some central banks in the euro area continue to publish a figure for money supply, but this only shows their country's contribution to the euro-area money supply). The European Central Bank (ECB) follows these aggregates closely, using principally a measure of type "M3", even though since 2003 this has been of secondary importance for the ECB compared with the inflation indicator. If M3 evolves too rapidly, the ECB may decide to raise its interest rates

There is obviously a relationship between the financial accounts and the money supply aggregate and its counterparts. Starting with the stylised diagram of the financial accounts shown in the text, extraction of the column "financial institutions" gives the following:

### Simplified balance sheet of financial institutions (FI)

|  | Assets | Liabilities |
|---|---|---|
|  | Financial institutions (FI) | Financial institutions (FI) |
| Deposits |  | W |
| Loans | X |  |
| Interbank refinancing | Y | Y |
| Securities | Z1 | Z3 |

Knowing that total interbank refinancing is roughly equal on the assets and liabilities sides, this row can be eliminated. Furthermore, it is assumed that the securities in the liabilities column are there only by convention, and so the preference is to show them in the assets column, with a negative sign, under the term "stable resources". We then have the following table:

**Money supply and its counterparts**

|  | Assets | Liabilities |
|---|---|---|
|  | Financial institutions (FI) | Financial institutions (FI) |
| Deposits |  | W |
| Loans | X |  |
| Securities | Z1 |  |
| Stable resources | −Z3 |  |

The money supply aggregate is then equal to total deposits W on the liability side of financial institutions. Its counterparts are the three items in the assets column: loans *plus* securities *minus* stable resources (securities on the liability side for financial institutions). The precise definitions of the money supply depend on the breadth of the definition of deposits. The following, in decreasing order of liquidity, are the definitions of M1, M2 and M3, according to the content of the items included in W:

M1 = currency in circulation (F21) + sight deposits (F22).

M2 =M1 + deposits repayable on less than three months' notice (including the products classified in F29) + term deposits with an initial maturity of less than two years.

M3 =M2 + repurchase agreements + holdings in monetary mutual funds + money market instruments (short-term securities for less than one year issued by financial institutions) + debt instruments with an initial maturity of less than two years.

Certain items in M2 and M3 have definitions that do not match categories in the financial accounts (notably the reference to maturities of less than two years). It is therefore not easy for anyone who is not an expert to make the precise reconciliation between the financial accounts and the monetary aggregates.

## Data sources: the statistical sources for the financial accounts

We will illustrate the sources of financial accounts using the case of Canada. The statistical sources for the Canadian financial accounts consist mainly of the financial balance sheets of banks, statistical surveys of other types of financial institutions and non-financial corporations, as well as administrative and survey data on governments and their agencies. Data on non-residents are a re-arrangement of the balance of payments and international investment position accounts. Data on households are

largely derived as counterpart entries from the source data of other sectors, in particular from financial institutions. The role of the financial accounts is to analyze for coherence and integrate data coming from various sources to produce comprehensive, accurate and reliable estimates of financial transactions and positions. Data from the "chartered"(commercial) banks form an integral part of the data in the financial account. Chartered bank data arise from a tri-party arrangement (central bank, regulator of financial institutions and Statistics Canada) whereby the banks submit to Statistics Canada on a quarterly basis booked-in-Canada income statement and balance sheet data along with a number of detailed supplementary schedules. The supplementary schedules provide crucial information on deposit-taking and lending activities with the sectors/industries/agents in the economy. For example, counterpart household borrowing/debt estimates (the bulk of these funds provided by chartered banks) are mainly constructed from banking loan asset detail. A periodic review of bank reporting is currently underway. Comprehensive surveys of other types of financial institutions are conducted by Statistics Canada mainly as part of the quarterly enterprise survey program in the economic statistics field. Near-banks (by sub-industry), life insurance business (by segment), investment funds, sales finance companies, consumer loan companies, issuers of asset-backed securities, investment dealers, investment management and holding companies, etc. are all part of this survey.

Questionnaires are sufficiently detailed to provide considerable asset breakdowns and to provide for reliable counterpart entry estimates in non-financial sectors (borrowing and investing) – in particular, in the household sector. For example, the survey on investment funds permits calculation of the mutual fund assets of households. Non-financial corporations' estimates are derived from quarterly enterprise survey program in the economic statistics field. While only total non-financial corporations are published in the financial accounts, the survey covers the underlying industries in considerable detail. Detailed quarterly surveys of pension funds are conducted as part of the social statistics program at Statistics Canada, and they make up an important share of institutional investors assets. The net pension assets of these surveyed plans provide the bulk of the employer-sponsored pension plan assets of the household sector. Government sector data (federal, provincial and local) are compiled from the annual audited Public Accounts as well as from sub-annual administrative sources and survey data. Government business enterprises are based principally on quarterly surveys. Detailed databases on liability-side issues/positions in securities (*i.e.* shares, corporate and government bonds) are also maintained as part of the supporting detail in the financial accounts. Comprehensive coverage of issues of securities and their details form the basis of these databases, which are used to supplement the survey-based information.

Financial transactions' asset-side information is mainly derived from adjusted (for capital gains, foreign currency adjustments, etc.) balance sheet survey data, discussed above. Adjustments are, to a significant extent, based on enterprise supplementary

survey schedules of revaluations of assets-liabilities by instrument. In addition to asset side transactions, the balance of payments group also makes use of a database derived from investment dealers' administrative information on new purchases of securities.

The household sector is constructed using indirect methods. Estimates are based largely on counterpart information from financial institutions for major asset holdings (deposits, pension assets, investment fund assets, life insurance assets, saving bonds) and for liabilities. However, selected financial assets are calculated using residual derivation. In particular, this is the case for marketable securities. While holdings of marketable debt instruments are not significant in the household sector, marketable shareholdings are, and depend on the quality of the information recorded elsewhere in the system. Non-marketable shareholdings are similarly derived. Household survey data are just starting to be used in the context of national financial accounts.

In many countries, as in Canada, financial accounts are mainly compiled based on banking statistics regarding the financing of the economy, whereas the non-financial accounts are based on the statistics of non-financial corporations. Therefore, it is hardly surprising that the two B9 balances, B9A and B9B, do not coincide in practice, and that a row showing a statistical discrepancy has to be introduced. In Europe, one exception is the account for general government, for which the banking sources and the administrative sources have been thoroughly standardized with the result that sometimes a statistical discrepancy can be avoided. Lastly, in financial accounts, source data is in some countries provided only in the form of outstanding amounts, or stocks. In this case, flow data have to be calculated by difference, imputing when necessary a valuation change in the amounts outstanding (see Exercise 6).

## The valuation of assets and its relationship to economic theory

In the national accounts, an economic asset is defined as a tangible or intangible good on which right of ownership is exercised and whose holding or use procures economic advantages for the owner.

In economic theory, the value of such an asset is equal to the "present value" of the future income it will bring in for its holder. Suppose that the asset brings in a sum of $S_t$ each year (t representing the year) until year T. Then, if all the conditions of perfect information and perfect competition are met, the market price of the asset is equal to $\Sigma S_t/(1 + r_t)^t$, summed from 1 to T, where $r_t$ denotes the discount rate, in other words agents' preference for the present (an interest rate containing no risk premium). This method could in theory have been used to calculate asset values in the national accounts, but it is difficult to apply in practice and so other methods are used. Even so, the calculation of present values is useful in helping to understand certain entries in the national accounts.

Take the case of a bond purchased at 1 000 and bringing in 10% a year, or 100, for five years. Its value is equal to the sum of the present values of each annual flow, in

other words to the annual flow divided by the discount rate raised to the power of the number of the period. It can be verified that this value is equal to 1 000, the purchase price of the bond.

| Period t | Annual flow | Discount rate or Interest rate (1 + 10%) raised to the power t | Present value (column 2 divided by column 3) |
|---|---|---|---|
| 1 | 100 | 1.1 | 90.90909 |
| 2 | 100 | 1.21 | 82.64463 |
| 3 | 100 | 1.331 | 75.13148 |
| 4 | 100 | 1.4641 | 68.30135 |
| 5 | 1 100 | 1.61051 | 683.0135 |
| | | *Sum of the present values*: | 1 000 |

Let us now suppose that interest rates fall on the capital markets. For example, suppose that at the end of Period 3 they fall suddenly to 5%. The value of the bond calculated using present values will rise simultaneously to 1 136.162, as shown in the following table. It is not surprising that it is at this new value that the markets find equilibrium. This is because the bond brings in 10%, twice the return on a newly issued bond. It is therefore normal that its price on the secondary bond market should rise. The national accounts record the increase (or the decrease, in the event of a rise in interest rates) in the value of the bond in its revaluation accounts as a holding gain (or loss). Exercise 4 illustrates this case, extending it to the even more complex cases of bonds issued below par, or with a zero coupon.

| Period t | Annual flow | Discount rate OR Interest rate (1 + 5%) raised to the power t | Present value |
|---|---|---|---|
| 3 | 100 | 1.05 | 95.2381 |
| 4 | 100 | 1.1025 | 90.70295 |
| 5 | 1 100 | 1.157625 | 950.2214 |
| | | *Sum of the present values:* | 1 136.162 |

The irrefutable logic of the calculation based on the sum of present values has numerous applications in national accounts. Let us suppose that an agent, for example a central government, undertakes to pay St per year for 10 years in the form of retirement benefits in return for the receipt in the current year of a sum A, which can be regarded as an advance payment of pension contributions. Exercise 3 shows that recording this transaction in the national accounts necessarily requires an interest element.

## Limitations of the national accounts: The exclusions from the balance sheet accounts

A very broad definition of investment as "expenditure made today that will provide income tomorrow" could have led to the use of an extensive notion of assets. The national accounts have not gone as far as this, so the following assets that meet this broad definition are excluded from the national accounts balance sheets: 1) human capital, which can be defined as the cumulative expenditure on the training of individuals; 2) research and development; 3) natural capital, which can be defined as the value of non-mineral natural resources (naturally-occurring water, air, etc.); 4) public monuments (the Château de Versailles in France, Stonehenge in England, the Forum in Italy, etc.); 5 ) household durable goods, which are conventionally recorded as consumption although their service life is longer than one year; 6) military "hardware" (aircraft carriers, military aircraft, nuclear missiles, etc.); 7) pension rights in pay-as-you-go plans; 8) certain intangible assets such as trademarks, customer goodwill, etc. On the liability side, conditional financial liabilities such as debt guarantees or provisions built up by firms are not included as liabilities in the national accounts. For example, the debt of public-sector enterprises guaranteed by the State is not recorded as a liability for central government in the national accounts.

The above limitations are regularly criticised because intangible assets are becoming increasingly more important in our sophisticated economies. The exclusion of R&D, for example, leads to the fact that national accounts ignore the output of all the innovators at work within companies. There are several reasons for these exclusions, in particular the difficulty of estimating some of the concepts involved. However, this boundary is not fixed for all time. There are ongoing discussions among national accounts experts concerning possible changes. In particular, the next system will most probably recognise R&D expenditure as investment and therefore as giving rise to assets. The same is true of military hardware. However, these changes will not take place before 2012.

In recent years, economic research has paid considerable attention to the idea of measuring human capital. This involves attaching a market value to each member of the population, especially as a function of his/her education. Studies on the application of this principle have calculated the economic value of qualifications as the present value of the additional salaries that can be expected during a person's lifetime as a result of obtaining a higher diploma. The 1993 SNA (§ 1.52) explains why it would be difficult to include this value in the national accounts:

"However, while knowledge, skills and qualifications are clearly assets in a broad sense of the term, they cannot be equated with fixed assets as understood in the System. They are not produced because they are acquired through learning, studying and practising – activities that are not themselves processes of production. The education services produced by schools, colleges, universities, etc., are consumed by

students in the process of their acquiring knowledge and skills. Education assets are embodied in individuals as persons. They cannot be transferred to others and cannot be shown in the balance sheets of the enterprises in which the individuals work (except in rare cases when certain highly skilled individuals are under contract to work for particular employees for specified periods)."

This final sentence explains why certain footballers are included as assets in the accounts of English football clubs. It is clearly the contracts with the players that are the assets and not the players themselves.

## The Flow of Funds

The table on the following pages is taken from the consolidated financial accounts published by the OECD for Spain. The table on the first page shows changes in assets; the table on the following page shows changes in liabilities.

A specific example will illustrate how to read this table, which covers transactions carried out during 2004. Spanish households (and NPISHs) "acquired" (in quotes because the figure is a net flow, *i.e.* the sum of acquisitions of financial assets and of the incurrence of liabilities) shares and other equity (F5) – including mutual funds shares – for a total of € 13.5 billion. During the same time period, non-financial corporations acquired € 28.5 billion, financial corporations € 33.1 billion and the rest of the world € 16.2 billion. The second part of the table identifies the issuers: € 16.1 billion by non-financial corporations; € 29.0 billion by financial corporations; and € 47.3 billion by foreign companies (these are shares in foreign companies bought by Spanish residents, households or corporations).

This table calls for these final remarks: Note that the balancing item is not called "net lending/net borrowing" but "net financial transactions". This is because while in principle the balancing item *net financial transactions* (net acquisition of financial assets *minus* net incurrence of liabilities) should correspond to the balancing item *net lending (+)/net borrowing (–) (B9)* in the capital account, this is not the case in practice; they are likely to diverge significantly because of differences in sources and errors of measurement. This is why in several parts of this chapter we have coded differently the two entries: one as "B9A", the other as "B9B". The latter can also be referred to as "net financial transactions".

## Spain, Consolidated Flows, by instrument and by sector, 2004

Million EUR

| | | Total economy | Non-financial corporations | Financial corporations | General government | Households and NPISH | Rest of the world |
|---|---|---|---|---|---|---|---|
| | | S1 | S11 | S12 | S13 | S14+S15 | S2 |
| **Net acquisition of financial** | | **371 966** | **60 163** | **218 327** | **9 880** | **83 596** | **145 522** |
| **F.1** | **Monetary gold and SDRs** | **−73** | **..** | **−73** | **..** | **..** | **73** |
| **F.2** | **Currency and deposits** | **89 461** | **11 837** | **25 331** | **6 131** | **46 161** | **14 090** |
| F.21 | Currency | 12 265 | 608 | −10 | – | 11 667 | – |
| F.22 | Transferable deposits | 20 250 | 7 785 | – | 3 597 | 8 869 | 78 |
| F.29 | Other deposits | 56 946 | 3 444 | 25 341 | 2 535 | 25 626 | 14 012 |
| **F.3** | **Securities other than shares** | **−2 264** | **5 009** | **−10 902** | **802** | **2 826** | **101 847** |
| F.33 | Securities other than shares, except financial derivatives | −1 432 | 3 264 | −8 325 | 802 | 2 826 | 102 863 |
| F.331 | Short-term | −2 832 | −2 411 | 89 | – | −510 | 392 |
| F.332 | Long-term | 1 399 | 5 675 | −8 414 | 802 | 3 337 | 102 471 |
| F.34 | Financial derivatives | −832 | 1 746 | −2 578 | – | – | −1 017 |
| **F.4** | **Loans** | **175 760** | **3 892** | **170 612** | **1 256** | **–** | **8 702** |
| F.41 | Short-term | 24 555 | −78 | 24 633 | – | – | 1 042 |
| F.42 | Long-term | 151 205 | 3 969 | 145 979 | 1 256 | – | 7 659 |
| **F.5** | **Shares and other equity** | **76 200** | **28 517** | **33 063** | **1 068** | **13 552** | **16 195** |
| F.51 | Shares and other equity, except mutual funds shares | 60 704 | 25 891 | 33 063 | 1 040 | 710 | 15 583 |
| F.511 | Quoted shares | 16 624 | 3 594 | 14 114 | – | −1 084 | 5 894 |
| F.512 | Unquoted shares | 30 195 | 10 110 | 18 603 | 588 | 894 | 3 061 |
| F.513 | Other equity | 13 884 | 12 186 | 346 | 452 | 901 | 6 627 |
| F.52 | Mutual funds shares | 15 496 | 2 626 | – | 28 | 12 841 | 612 |
| **F.6** | **Insurance technical reserves** | **17 249** | **1 848** | **408** | **–** | **14 993** | **–** |
| F.61 | Net equity of households in technical reserves | 13 130 | **–** | **–** | .. | 13 130 | .. |
| F.611 | In life insurance reserves | 5 860 | .. | | .. | 5 860 | .. |
| F.612 | In pension funds | 7 270 | .. | | .. | 7 270 | .. |
| F.62 | Prepayments of premiums and reserves for outstanding claims | 4 119 | 1 848 | 408 | .. | 1 863 | .. |
| **F.7** | **Other accounts receivable** | **15 634** | **9 060** | **−112** | **622** | **6 064** | **4 616** |
| F.71 | Trade credits and advances | 7 762 | 5 502 | **–** | – | 2 260 | 4 646 |
| F.79 | Other | 7 872 | 3 557 | −112 | 622 | 3 804 | −30 |

StatLink: *http://dx.doi.org/10.1787/114767212178*

## Spain, Consolidated Flows, by instrument and by sector, 2004 *(cont.)*

### Million EUR

| | | Total economy | Non-financial corporations | Financial corporations | General government | Households and NPISH | Rest of the world |
|---|---|---|---|---|---|---|---|
| | | S1 | S11 | S12 | S13 | S14+S15 | S2 |
| **Net incurrence of liabilities** | | **406 121** | **97 553** | **212 181** | **12 264** | **84 123** | **111 367** |
| **F.2** | **Currency and deposits** | **73 228** | **–** | **72 992** | **236** | **–** | **30 323** |
| F.21 | Currency | 8 078 | .. | 7 842 | 236 | .. | 4 187 |
| F.22 | Transferable deposits | 20 328 | .. | 20 328 | – | .. | – |
| F.29 | Other deposits | 44 822 | .. | 44 822 | – | .. | 26 136 |
| **F.3** | **Securities other than shares** | **85 760** | **957** | **82 381** | **2 421** | **–** | **13 823** |
| F.33 | Securities other than shares, except financial derivatives | 85 245 | 957 | 81 867 | 2 421 | .. | 16 186 |
| F.331 | Short-term | −2 440 | 793 | −783 | −2 450 | .. | – |
| F.332 | Long-term | 87 685 | 164 | 82 650 | 4 871 | .. | 16 186 |
| F.34 | Financial derivatives | 514 | – | 541 | – | .. | −2 363 |
| **F.4** | **Loans** | **177 782** | **82 709** | **−314** | **7 527** | **87 860** | **6 680** |
| F.41 | Short-term | 23 992 | 21 416 | **−83** | 37 | 2 623 | 1 605 |
| F.42 | Long-term | 153 789 | 61 293 | −231 | 7 490 | 85 237 | 5 075 |
| **F.5** | **Shares and other equity** | **45 050** | **16 057** | **28 993** | **–** | **–** | **47 345** |
| F.51 | Shares and other equity, except mutual funds shares | 28 942 | 16 057 | 12 885 | .. | .. | 47 345 |
| F.511 | Quoted shares | 11 045 | −1 466 | 12 511 | .. | .. | 11 473 |
| F.512 | Unquoted shares | 10 169 | 8 956 | 1 214 | .. | .. | 23 088 |
| F.513 | Other equity | 7 728 | 8 567 | −840 | .. | .. | 12 784 |
| F.52 | Mutual funds shares | 16 108 | – | 16 108 | .. | .. | – |
| **F.6** | **Insurance technical reserves** | **16 841** | **−449** | **17 290** | **–** | **–** | **408** |
| F.61 | Net equity of households in technical reserves | 13 130 | −449 | 13 579 | .. | .. | – |
| F.611 | In life insurance reserves | 5 860 | – | 5 860 | .. | .. | .. |
| F.612 | In pension funds | 7 270 | −449 | 7 720 | .. | .. | .. |
| F.62 | Prepayments of premiums and reserves for outstanding claims | 3 711 | – | 3 711 | .. | .. | 408 |
| **F.7** | **Other accounts payable** | **7 462** | **−1 720** | **10 839** | **2 080** | **−3 737** | **12 788** |
| F.71 | Trade credits and advances | 7 074 | 6 906 | 1 214 | 506 | −338 | 5 334 |
| F.79 | Other | 387 | −8 627 | 10 839 | 1 574 | −3 399 | 7 454 |
| | **Net financial transactions** | **−34 155** | **−37 390** | **6 146** | **−2 384** | **−527** | **34 155** |

StatLink: *http://dx.doi.org/10.1787/114767212178*

# Exercises

**Answer**

## Exercise 1: Say whether the following affirmations are true or false

In the national accounts: *a)* a holding gain adds to agents' income; *b)* a holding loss reduces agents' income; *c)* a transaction is generally recorded four times; *d)* every non-financial transaction has a counterpart recorded as a financial transaction; *e)* every financial transaction has a counterpart recorded in the non-financial accounts,; *f)* the price of an asset remains constant, at its purchase price; *g)* human capital is included in the evaluation of national accounts wealth; *h)* in a closed economy, the sum of the balancing items B9 is zero; *i)* repayment of a loan leads to an increase in recorded assets; *j)* the difference between the net values at 31 December in the current year and 31 December in the previous year is explained entirely by the balancing item B9 of the agents concerned.

## Exercise 2: Quadruple entry

**Answer**

Household H is employed by corporation C, a producer/supermarket. To simplify the entries, it will be assumed that all the household's economic relations are with this one corporation. H receives a salary of 40 000 from the corporation and consumes 30 000 in products from the corporation. With the remaining 10 000, the household buys further shares in the corporation for 2 000, and with the remaining 8 000 it pays off part of the debt contracted with the employer the previous year, amounting to 15 000. The corporation pays H a dividend of 200, and H pays the corporation interest on its debt, amounting to 300. Lastly, the corporation grants H another loan of 9 000. Draw up the financial and non-financial T-accounts. Check the accounting identities. Would the recording of the credit of 9 000 to H have been the same if the corporation had been a bank? Among these transactions, find one that is purely financial, and demonstrate that it has no impact on B9 and hence no impact on net worth.

## Exercise 3 (difficult): Application of accrual accounting

**Answer**

Let us suppose that an agent, the central government in this case, undertakes to pay retirement benefits amounting to S for a period of 10 years, in return for the payment by households in year 0 of a sum A, which can be assimilated to a contribution. The aim of the exercise is to record this transaction in the national accounts on an accrual basis.

**Question 1:** show the relationship between A and the series of payments S, using the calculation of the present value.

**Question 2:** record the initial transaction and the series of payments S using the T-shaped financial accounts without the introduction of interest.

**Question 3:** calculate the residual debt of central government at the end of the first period of payment of benefits and show that it is different from the present value of this residual debt. Deduce from this that it is necessary to record interest. Draw up all the corresponding T-shaped accounts. Draw a parallel with a loan. Justify the fact that the B9 of central government is negative. Conclude from this that if interest is recorded the transaction will be neutral as regards agents' wealth.

## Exercise 4: Calculation of the value of a bond          Answer

This exercise is a direct application of the section "Going a step further: the valuation of assets and its relationship to economic theory". The market rate of interest is 4%. Let there be a Treasury bond of $1 500 issued in 2004 and carrying a coupon of $60 per year for 10 years.

**Question 1:** verify that the bond was issued at the market rate and that the issue price of this bond corresponds to the present value of the future income from it.

**Question 2:** suppose that, in 2007, the interest rate for these same Treasury bonds increases to 6%. What will be the new price of the bond on the secondary market? How will the national accounts record this difference in price for the bondholder and for the issuer of the bond? Comment.

**Question 3:** return to question 1. Let us suppose that the government issues the same bond at a price of $1 250. How should the difference *versus* the market price be treated in the national accounts?

**Question 4:** let us suppose that the government issues this bond in the form of a zero-coupon bond, putting it on sale at a price of $1 014. How should this case be treated in the national accounts?

## Exercise 5: Treatment of debt cancellation          Answer

Using the principles of quadruple entry, record the transaction by which the Spanish government cancels a debt of 1 000 that it had granted to a corporation that had not paid its taxes. Draw up a simplified financial T-account for the two agents before the transaction, and then describe the transaction in terms of flows. Identify the impact on the B9s of central government and the firm. Justify this economically. Deduce from the accounting identity of the non-financial and financial B9s that it is imperative to enter a counterpart in the non-financial transactions (D99, a capital transfer).

Draw conclusions for the impact on the central government resulting from a debt cancellation granted by Spain to a developing country. Discuss.

## Exercise 6: Calculations of flows using stocks at market value

The sources for the financial accounts are largely bank balance sheets. The difference from one year to another in these balance sheets $(S^t - S^{t-1})$ can be used to calculate the flow (F), but as we have seen, it is necessary to make a distinction between a flow and a revaluation. Each of these two elements has to be estimated, using simple assumptions. This exercise will illustrate the calculation. The starting point is the following equation: $S^t = S^{t-1} + vS^{t-1} + F + (v/2)F$, where v denotes the change in price between t – 1 and t. This equation expresses the fact that the stock at the end of the period $S^t$ is equal to the stock at the beginning of the period $S^{t-1}$ *plus* the revaluation of the stock held at the beginning of the period $vS^{t-1}$ *plus* the transaction (F) *plus* the revaluation for the transaction (v/2)F. The assumption is made that transaction F takes place in the middle of the period, hence the term v/2.

Use this equation to calculate F in the following case of loans denominated in US$. We suppose $S^{t-1}$(in euros) = 1 000; $S^t$ = 1 500; US$/euro exchange rate in t – 1 = 1; US$/euro exchange rate in t = 0.8.

**Answer**

## ▼ Answer to exercise 1. Say whether the following affirmations are true or false

• False.
• False: holding gains and losses do not enter into the calculation of income but are recorded in a special account situated further down the sequence of accounts.
• True.
• Almost true: however, barter transactions are recorded as non-financial transactions and not as financial transactions.
• False: certain transactions aimed at changing the composition of financial balance sheets, such as the sale of shares, are only financial transactions and have no non-financial counterpart.
• False: assets are valued at market prices and therefore their valuation varies from one year to another.
• False: see section "Limitations of the national accounts: The exclusions from the balance sheet accounts".
• True.
• False: it is recorded as a decrease in liabilities.
• False: item B9 enters into this difference, but there are also other factors explaining the difference between the net values, including holding gains and losses, consumption of fixed capital and other changes in volume.

*To download the answers in Excel, please click the StatLink: http://dx.doi.org/10.1787/211820836062.*

| Accounts of household H | | | | Accounts of corporation C | | | |
|---|---|---|---|---|---|---|---|
| Non-financial transactions | | | | Non-financial transactions | | | |
| Uses | Resources | | | Uses | Resources | | |
| Salaries | 40 000 | | | Salaries | | 40 000 | |
| Consumption | 30 000 | | | | Output | 30 000 | |
| Interest | 300 | Dividend | 200 | Dividend | 200 | Interest | 300 |
| B9 Net lending/net borrowing | +9 900 | | | B9 Net lending/net borrowing | | −9 900 | |

| Accounts of household H | | | | Accounts of corporation C | | | |
|---|---|---|---|---|---|---|---|
| Financial transactions | | | | Financial transactions | | | |
| ? Assets | | ? Liabilities | | ? Assets | | ? Liabilities | |
| Bank account | | | | Bank account | | | |
| | +40 000 | | | | −40 000 | | |
| | −30 000 | | | | +30 000 | | |
| | +200 | | | | −200 | | |
| | −300 | | | | +300 | | |
| | −2 000 | | | | +2 000 | | |
| | −8 000 | | | | +8 000 | | |
| | +9 000 | | | | −9 000 | | |
| | = 8 900 | | | | = − 8 900 | | |
| Shares | +2 000 | | | | | Shares | +2 000 |
| | Loans | | −8 000 | | Loans | −8 000 | |
| | | +9 000 | | | +9 000 | | |
| | | = +1 000 | | | = +1 000 | | |
| | B9 Net lending/net borrowing | +9 900 | | | B9 Net lending/net borrowing | −9 900 | |

We shall comment only on the financial transactions. It is assumed in the answer that the transactions pass through the agents' bank accounts. For example, the salary of 40 000 is credited to the household's account and debited to that of the corporation for the same amount. It is the same, but with opposite signs, for the consumption of 30 000. The recording of interest and dividends is similar. The household buys shares for 2 000, and this is recorded as −2 000 in the bank account and +2 000 as a change in assets in the form of shares. Seen from the side of the corporation, the bank account will be credited with an entry of +2 000 together with an addition of 2 000 to liabilities in the form of shares. The household repays 8 000 on an earlier loan and this is recorded as −8 000 in its bank account and −8 000 as a change in its liabilities, since repayment means a reduction in its debt. As a counterpart, the corporation shows an entry of −8 000 under loans, but this time on the asset side, while on the same side, its bank account increases. The household borrows an additional 9 000 from the corporation. Its liabilities under loans increase while its assets in its bank account increase. The corresponding reverse entries are made for the corporation, entirely on the asset side.

Note that the recording of the loan to the household might not have been the same if the corporation had been assimilated to a bank. In this case, the counterpart of the loan of 9 000 granted by the corporation could have been entered in its liabilities as a means of payment. This would have been the case if the corporation, acting as a bank, had opened a line of credit in the form of drawing rights on the bank account of the household. The banks are the only agents to have means of payment in their liabilities, reflecting their capacity to create money.

We can now check the accounting identities. First, it can be verified that the balancing item B9 of the non-financial account of each agent is equal to the balancing item B9 of its financial account. Second, it can be verified that the sum of the agents' B9s is zero (this example is of a closed economy). It can also be verified that each transaction cancels out between the agents across the rows: for example, the consumption of 30 000 under uses (negative sign) cancels out the output of 30 000 under resources (positive sign). Similarly, in the financial accounts the positive movements in the bank accounts of each agent carry opposite signs in the accounts of each of them. Some financial transactions carry the same sign. For example, the purchase of shares by the household is equal to +2 000, while the creation of shares is also recorded as +2 000 in the corporation's financial accounts. Note, however, that these items are in the one case recorded under assets and in the other under liabilities. They therefore cancel each other out under our convention.

An example of a purely financial transaction is the purchase of shares. This consists simply of the household exchanging a financial asset (cash) for another (shares). No non-financial transaction is involved. It can be verified that a purely financial transaction has no impact on B9, since the exchange of cash for shares is neutral from the point of view of the household's B9. In other words, it leaves the household's financial net worth intact. The same is true in the situation of the corporation, since the transaction involved in the creation of shares consists of exchanging a debt (albeit a false one) for cash, leaving the wealth situation unchanged.

### ▼ Answer to exercise 3. Application of accrual accounting
### Question 1:

Central government receives from households in period 0 a sum A in return for which it undertakes to pay these same households a sum S every year from year 1 to year T. It therefore consists of an exchange over time of two sums. In principle, the transaction should be equitable between the two agents, otherwise they would not make it. As a consequence, sum A has to be equal to the sum of the present values of the flows S that the government must pay households. In other words, $A = \sum S/(1 + r)^t$, with t varying from 1 to T (it is assumed that the interest rate r remains constant over the period).

### Question 2:

In the framework of accounts on an accrual basis, the government's undertaking to pay pension benefits in the future in return for a contribution today can be analysed as a financial operation. (It is in fact slightly more complicated than this, since the present system of national accounts recommends recording also the non-financial subscription and benefit transactions, but we shall ignore this.) The following is the T-account corresponding to the initial year, the one in which the exchange transaction takes place:

| Central government | | | | Households | | | |
|---|---|---|---|---|---|---|---|
| ? Assets | | ? Liabilities | | ? Assets | | | ? Liabilities |
| F2 Currency and deposits | +A | Pension rights | +A | F2 Currency and deposits | -A | | |
| | | | | Pension rights | +A | | |
| | | B9 | 0 | | | B9 | 0 |

The government receives the sum A, so its currency assets increase by A. At the same time, however, its pension debt rises by the same amount. The corresponding transactions for households are the decrease in their currency assets and also the increase in their assets in the form of pension rights. Note that for both agents the balancing item B9, net lending/net borrowing, is zero (everything else remaining equal). This confirms that the transaction is neutral as regards the agents' net worth. Neither of them is richer as a result of this transaction and this appears to be in conformity with the notion that the transaction is an equitable one.

The T-account for one of the later years is as follows:

| Central government | | | | Households | | | |
|---|---|---|---|---|---|---|---|
| ? Assets | | ? Liabilities | | ? Assets | | | ? Liabilities |
| F2 Currency and deposits | -S | Pension rights | -S | F2 Currency and deposits | +S | | |
| | | | | Pension rights | -S | | |
| | | B9 | 0 | | | B9 | 0 |

The government pays out S in retirement benefits, thus reducing its monetary assets but at the same time reducing its benefit debt. The transactions in the case of households can be deduced accordingly.

### Question 3:

Analysis of the previous accounts shows that there is a problem. The government debt at the end of the first period of payment of benefits is equal, according to the above accounts, to A-S. However, this residual debt A' can also be obtained by calculating the present value of the remaining flows: $A' = \sum S/(1 + r)^t$, with t varying from 1 to T − 1. One can show that A' is not equal to (A − S) but to (A-S + rA). (The complete calculation will be found in the appendix on the following page.) This last term rA is the value of the interest to be paid on the sum A.

Hence, the actual entries for this transaction are more complex and introduce non-financial transactions in the form of imputed interest.

### Non-financial accounts

| Central government | | Households | | |
|---|---|---|---|---|
| Uses | Resources | Uses | Resources | |
| Interest | | | Interest | rA |
| B9 | −rA | B9 | + rA | |

### Financial accounts

| Central government | | | Households | | |
|---|---|---|---|---|---|
| ? Assets | | ? Liabilities | ? Assets | | ? Liabilities |
| F2 Currency and deposits | −S | | F2 Currency and deposits | +S | |
| | Pension rights | −S + rA | Pension rights | −S + rA | |
| | | B9    −rA | | | B9    +rA |

It can be verified that with these accounts one does indeed obtain a value for the residual government debt equal to the present value of the flows remaining to be paid at the end of this first period. Incidentally, note that these accounts necessarily verify the theorem concerning the zero sum of the B9s.

The transaction becomes crystal clear when one draws the parallel with a simple loan transaction. Indeed, one can assimilate this anticipatory payment that we have called a loan made by the households to the government and repayable by means of annual debt service S. This sum S is made up of two elements: first, an interest element paid by the government (equalling rA in the first period) and, second, capital repayment (S – rA).

It can be seen that, contrary to what was said in the reply to Question 2, the transaction does not appear to be equitable, since the B9s are not zero. The government seems to be worse off since its B9 is negative (−rA), whereas the households' B9 is positive by the same amount, meaning that they have become richer. But this fails to reflect the fact that we have recorded only those transactions immediately related to our example. In fact, the government has at its disposal at the beginning a sum A that it can invest (or use to reduce its debt). It will therefore necessarily receive rA in return, but we have not recorded this. Conversely, by paying A to the government, the households have implicitly invested their money with the government. As a consequence, contrary to appearances, the recording of transactions we have proposed here is equitable and neutral as regards the wealth of the two agents. It was the previous recording that was not.

## Box 8.1: Appendix: calculation of the difference between A' and A:

$$A = S/(1 + r) + S/(1 + r)^2 + S/(1 + r)^3 + \ldots\ldots + S/(1 + r)^T$$

$$A' = S/(1 + r) + S/(1 + r)^2 + \ldots\ldots + S/(1 + r)^{T-1}$$

$$A' - A = -S/(1 + r) + [S/(1 + r) - S/(1 + r)^2] + [S/(1 + r)^2 - S/(1 + r)^3] + \ldots + [S/(1 + r)^{T-1} - S/(1 + r)^T]$$

Summing and deducting S gives:

$$A' - A = -S + [S - S/(1 + r)] + [S/(1 + r) - S/(1 + r)^2] + [S/(1 + r)^2 - S/(1 + r)^3] + \ldots + [S/(1 + r)^{T-1} - S/(1 + r)^T]$$

$$A' - A = -S + rS/(1 + r) + rS/(1 + r)^2 + rS/(1 + r)^3 + \ldots + rS/(1 + r)^T$$

$$A' - A = -S + r[S/(1 + r) + S/(1 + r)^2 + S/(1 + r)^3 + \ldots + S/(1 + r)^T]$$

$$A' - A = -S + rA<$$

▼ **Answer to exercise 4. Calculation of the value of a bond**

***Question 1:***

The bond was issued at $1 500. The coupon of $60 does indeed represent 4%: 60/1 500 = 0.04. The table below makes it possible to calculate the present value of the future flows brought in by this bond, using the formula $\Sigma S_t/(1 + r)^t$.

The second column sets out the sequence of future flows: $60 per year for nine years and $1 560 in the final year (interest of $60 *plus* capital repayment of $1 500). The third column shows the series of discounting factors for the period, *i.e.* the term $(1 + r)^t$, where r = 0.04 and t is the number of the period. The fourth column corresponds to the division of the second by the third and ends with the calculation of the sum of these present values. It is verified that the issue price of $1 500 does indeed correspond to the present value of the sequence of future flows.

| Period | Future flows | Discounting factors (r = 4%) | Present value |
|--------|--------------|------------------------------|---------------|
| 1 | 60 | 1.04 | 57.69231 |
| 2 | 60 | 1.0816 | 55.47337 |
| 3 | 60 | 1.124864 | 53.33978 |
| 4 | 60 | 1.169859 | 51.28825 |
| 5 | 60 | 1.216653 | 49.31563 |
| 6 | 60 | 1.265319 | 47.41887 |
| 7 | 60 | 1.315932 | 45.59507 |
| 8 | 60 | 1.368569 | 43.84141 |
| 9 | 60 | 1.423312 | 42.1552 |
| 10 | 1 560 | 1.480244 | 1 053.88 |
| | | Sum of the present values = 1 500.00 | |

***Question 2:***

In 2007, the market interest rate rises to 6%. The value of the bond will fall on the secondary bond market, since the bond was issued at a rate of 4%, *i.e.* below the new market interest rate. In other words, a bond for $1 500 issued in 2007 will bring in $90 per year (6%), and not $60. To find the new price of the bond, we calculate the present value of the future flows using the new discount rate of 6%, with the help of the following table.

We are at the beginning of 2007, so the bond has only seven years to run. The sequence of future flows is unchanged from that of the previous table. However, the rate of discount has risen to 6%. The sum of the present values is equal to 1 332.5, which is less than 1 500. If the market is perfect, and if the risk of government insolvency is unchanged, this will be the new price of the bond on the secondary market. The holder of the bond therefore suffers a holding loss of (1 500 – 1 332.5) = 167.50.

| Period | Future flows | Discounting factors (r = 6%) | Present value |
|--------|--------------|------------------------------|---------------|
| 1 | 60 | 1.06 | 56.60377 |
| 2 | 60 | 1.1236 | 53.39979 |
| 3 | 60 | 1.191016 | 50.37716 |
| 4 | 60 | 1.262477 | 47.52562 |
| 5 | 60 | 1.338226 | 44.83549 |
| 6 | 60 | 1.418519 | 42.29763 |
| 7 | 1 560 | 1.50363 | 1 037.489 |
| | | Sum of the present values = 1 332.529 | |

The national accounts record this holding loss in the revaluation accounts of the balance sheet accounts of the bondholder. A table dealing just with this bond might then be as follows for the year 2007:

| Balance sheet accounts | Stock at 31/12/2006 | Consumption of fixed capital | Changes | Revaluation | Other changes in volume | Stock at 31/12/2007 |
|------------------------|---------------------|------------------------------|---------|-------------|-------------------------|---------------------|

**Question 3:**

We now come back to the period of the original issue of the security. However, instead of issuing the bond at $ 1 500, suppose that the government issues it at $ 1 250, a difference of $ 250 compared with the market price, this difference being known as the issue premium (it is also said that the bond was sold "below par"). This difference will be treated in the national accounts as an interest premium of $ 250, to be spread over the 10 years of life of the bond, *i.e.* $ 25 per year. The national accounts will therefore enter $85 as interest paid instead of the $ 60 on the coupon. The value of the bond in the liabilities of the government will be equal to $ 1 250 at the time of issue and will be raised each year by the value of the "accrued interest not yet due", represented by $ 25 per year.

**Question 4:**

The Treasury sometimes issues so-called zero-coupon bonds. In this case, it does not make annual interest payments but repays a larger amount at the time of maturity of the bond. It is then recorded in the national accounts that the government has implicitly made the issue below par, as in Question 3. For example, the government undertakes to repay $ 1 500 in 10 years' time, with zero interest. Since interest rates are at 4%, the present value of this 10-year debt is equal to 1 500/1.48 (this being the discount rate over 10 years), which is equal to $ 1 014. The government will issue the bond at this price, and this is the price that will be recorded in the national accounts at the time of issue. The difference between $ 1 500 and $ 1 014 will be entered in the national accounts as interest spread over 10 years, *i.e.* $ 48.60 per year. This "accrued interest not yet due" will be added each year to the value of the bond, as in Question 3.

**▼ Answer to exercise 5. Treatment of debt cancellation**

*To download the answers in Excel, please click the StatLink: http://dx.doi.org/10.1787/844633432403.*

| Central government | | | | Corporation | | |
|---|---|---|---|---|---|---|
| Assets | | Liabilities | Assets | Liabilities | | |
| F79 Other accounts receivable

(the tax arrears) | 1 000 | | | F79 Other accounts payable
(the tax arrears) | | 1 000 |

| Central government | | | | Corporation | | |
|---|---|---|---|---|---|---|
| ? Assets | | ?
Liabilities | ?
Assets | ? Liabilities | | |
| F79 Other accounts receivable
(the tax arrears) | –
1 000 | | | F79 Other accounts payable
(the tax arrears) | | –1 000 |
| | | B9 | –
1 000 | B9 | | +1 000 |

It will be seen from the next table that the effect of the debt cancellation on the balancing item B9 of the financial account is negative for central government and positive for the corporation. This is as it should be. The government is poorer as the result of cancelling the debt, and the corporation is richer.

Because of the accounting identity between the B9 in the financial account and the B9 in the non-financial account, the latter necessarily carries the same value, *i.e.* –1 000 for the government and + 1 000 for the corporation. It is therefore necessary to record a non-financial transaction. In this case, the category used is "D99 other capital transfers". We then have the following complete non-financial and financial flow accounts:

| Central government | | Corporation | | |
|---|---|---|---|---|
| Uses | Resources | Uses | Resources | |
| | D99 Other capital transfers    –1 000 | | D99 Other capital transfers | +1 000 |
| B9    –1 000 | | B9? +    1 000 | | |

| Central government | | | | Corporation | | |
|---|---|---|---|---|---|---|
| ? Assets | | ?
Liabilities | ?
Assets | ? Liabilities | | |
| F79 Other accounts receivable (the tax arrears) | –
1 000 | | | F79 Other accounts
payable

(the tax arrears) | | –1 000 |
| | | B9 | –
1 000 | B9 | | +1 000 |

If Spain cancels debt owed to it by a developing country, the same mechanism will be used, with the same economic justification: Spain (in other words, the Spanish central government) has become poorer and the developing country has become richer. A debt cancellation therefore leads to an increase in the public deficit, measured by B9 (see Chapter 9). Remembering that the European Stability and Growth Pact aims to reduce public deficits (the Maastricht criteria), this shows the dilemma facing the Spanish treasury: by being generous to the developing country, it runs the risk of displeasing Brussels (the town where is located the European Commission).

**▼ Answer to exercise 6. Calculations of flows using stocks at market value**

v = −20% (0.8/1), or −0.2 . $S^t = S^{t-1} - 0.2S^{t-1} + F - 0.1F$

Hence F = $(S^t - 0.8S^{t-1})/0.9$ = (1 500 − 800)/0.9 = 777