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VALUE AND INCOME IN THE NATIONAL ACCOUNTS AND ECONOMIC THEORY

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National accounting concepts of value and income differ from their economic theoretic counterparts in two respects. Firstly, they are more precise in order to give concrete guidelines for measurement, e.g. with respect to the concept of capital formation and the treatment of taxes. Secondly, they are fundamentally different. Valuation in the national accounts is not forward-looking and not based on a notion of perfect competition. Similarly, concepts of income in the national accounts are not measures of net return to wealth or welfare and they do not intend to show income as a reward for some specific factors of production. The national accounts concepts of value and income are descriptive concepts that can only be well understood in view of the specific accounting framework to which they belong.

1. INTRODUCTION

The relationship between national accounts and economic theory is commonly misunderstood by economic theorists as well as by national accountants. The purpose of this article is to demolish some of the myths surrounding this relationship. In section 2, we provide an historical background. In sections 3 and 4, the spotlights are on value and income respectively, as they are at the heart of both national accounting and economic theory. These sections discuss the principles of valuation and concepts of income in the national accounts and compare them with their economic theoretic counterparts, such as net present value, net return to wealth, factors of production and welfare. Conclusions are drawn in section 5.

2. A SHORT HISTORICAL BACKGROUND

National accounting and economic theory have a long joint history, both in persons and in concepts.[1] Some important cases in point are:

—King and Petty are not only the founding fathers of national accounting, but should also be remembered for their contributions to economic theory.[2] King's law of demand can be regarded as the first statistical demand curve. Petty is known for his work on the velocity of money. He also acknowledged the importance of the concept of human capital, by making an estimate of its value in England.

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[1]On the history of national accounting, see Bos (1992a) and Kenessey (1994).

[2]See Schumpeter (1954, p. 213).

—Kuznets' work on economic growth and historical time series has been important to both national accounting and economic theory. The same applies to Leontief's pathbreaking work on input–output analysis.

—Hicks and Frisch are generally known for their contributions to economic theory and econometrics. However, they also made important contributions to national accounting.

—The reverse situation holds for Stone: his role in the development of international guidelines on national accounting is his most outstanding contribution but he should also be remembered as one of the pioneers of econometrics.

—The Keynesian revolution was important to both economic theory and national accounting. It stimulated the development of the national accounts all over the world. The drastic increase in the availability of national accounts figures reinforced the Keynesian revolution in economic theory (and policy). Furthermore, during the Second World War, Keynes, at that time a high ranking official in the U.K., asked Stone and Meade to develop and estimate a system of national accounts for improving the planning of the war budget.

Since the Second World War, the role and nature of national accounting has drastically changed. National accounting has become well-established and institutionalized:

—National accounting concepts are debated in international fora and the conclusions are formulated in international guidelines;

—Compiling national accounts figures have come to be regarded as an official task of the government (and not of individual researchers);

—The "standard" national accounting figures has become the framework of reference for social and economic policy all over the world.

This institutionalization with respect to the concepts used, the compilation of national accounts time-series and the use of the national accounts has reduced the room for interaction wth economic theory and economic theorists. National accounting has become a separate branch of economics, relatively inaccessible for outsiders, as the standardized national accounting concepts are specific, complex and partly based on compromises, which are often difficult to understand (see Denison, 1971, p. 38).

One of the consequences has been some misunderstanding by both national accountants and economic theorists of the proper nature of national accounting concepts and their links to economic theory. This paper is an effort to reduce such misunderstanding.

A new generation of international guidelines on national accounting will be implemented in the forthcoming years:

—the System of National Accounts published in 1993 (the 1993 SNA);

—the European System of National and Regional Accounts (1995 ESA).

The 1993 SNA applies to all countries over the world. The 1995 ESA is consistent with the 1993 SNA but:

—it differs substantially in presentation, e.g. it contains less explanation of the philosophy behind the concepts, it is much more concise and discusses concepts by type of transaction and not by type of account;

—it is in several instances more specific and precise in its concepts, because it focuses on the circumstances in the European Union and because for some concepts the 1993 SNA text was not sufficiently clear.[3]

Our discussion on valuation and income in the national accounts will be based on the concepts in these guidelines.

3. The Concept of Value in the National Accounts and Economic Theory

3.1. *Valuation in the International Guidelines*

In this section valuation in the international guidelines is described in general terms. In the subsequent sections, valuation is discussed in view of two specific principles of valuation:

—net present value (section 3.2);

—production costs (section 3.3).

According to the international guidelines, the *general principle of valuation* in the national accounts is the *current exchange value*, i.e. "the values at which goods and other assets, services, labour or the provision of capital are in fact exchanged or else could be exchanged for cash (currency or transferable deposits)" (1993 SNA, paragraph 3.70). This principle of valuation is a *strictly descriptive* principle to the extent that exchange for cash actually takes place. The current exchange value does not correspond to theoretical notions of prices under perfect competition, because it will reflect all kinds of imperfections in the market mechanism. For example, when there is a monopoly, the current exchange value will be a monopoly price (see Bos, 1993, pp. 14–21).[4] The current exchange value may also be entirely inconsistent with world market prices, e.g. when national prices are distorted by huge subsidies and transfers. Valuation at world market prices is proposed by Ward (1994) to drastically improve national accounts as an economic policy tool for developing countries and the Eastern European economies in transition. However, this would not be a strictly descriptive principle.

Valuing output and intermediate consumption at current exchange value also implies that the (unrealized) external costs of institutional units are not taken into account, e.g. the costs of cleaning polluted land and water. However, if and when another institutional unit bears these costs, e.g. if the government pays to clear up polluted land, then they are registered in the accounts of that unit.

In order to attain the various types of *consistency required by a national accounting system* (see Bos, 1995, section 3), the current exchange value is optimally suited, because if some item is in fact exchanged for cash this value has a clear counterpart in the financial flows. Furthermore, if it concerns a transaction between institutional units, it is relevant for both parties involved.

[3]The main differences between the 1995 ESA and 1993 SNA are summarized in paragraph 1.25 of the 1995 ESA. See also Bos (1996b, section 3).

[4]The guidelines make only one exception: transfer pricing. However, this exception is usually wishful thinking as it is just too difficult and time-consuming for statisticians to try to distinguish a transfer price from a market price.

However, the perception of the current exchange value may differ for the parties involved. Therefore, in the guidelines two types of current exchange values are used for valuing flows of products:

—*basic prices*: supplies of products, i.e. production and imports are valued at basic prices;

—*purchasers' prices*: uses of products, i.e. intermediate consumption, final consumption, capital formation and exports are valued at purchasers' prices.

In contrast to basic prices, purchasers' prices also include taxes and exclude subsidies on products and transport charges paid separately by the purchaser to take delivery at the required time and place. Both basic prices and purchasers' prices exclude deductible VAT.

The supply and use tables are drawn up in such a way that both types of valuation are used in a consistent manner. The proof of this consistency is that two types of identities hold in the supply and use tables.

1. The identity by industry: Output by industry = Input by industry. So for each industry: Output = Intermediate consumption + Value Added.

2. The identity by product: Total supply by product = Total use by product. So, for each product: Output + Imports = Intermediate consumption + Exports + Final Consumption + Gross capital formation.

For the supply and use of labour only one principle of valuation is used in the guidelines, because there is only one definition of compensation of employees. However, differences in perception between the employer and the employee of the current exchange value of labour are partly taken into account by showing the employers' social contributions separately (but as part of compensation of employees).

The current exchange value is well-defined for items that are in fact exchanged for cash. However, for other transactions "the value at which they could have been exchanged" is still to be defined. This pertains, for example, to wages and salaries in kind, barter and production for own final use.

Arranged from most to least preferred, three supplementary principles of valuation are distinguished in the guidelines:

(1) prices of similar items exchanged for cash elsewhere;

(2) production costs;

(3) net present value (discounted present value of expected future returns) (see 1993 SNA, paragraphs 3.70–3.75).

The first supplementary principle is to use prices of similar items exchanged for cash elsewhere. This principle should only be applied for market output and output for own final use. In the 1993 SNA, this first supplementary principle is sometimes referred to as "production costs including a mark-up" (e.g. in paragraph 3.73). In the 1995 ESA, this confusing wording has been avoided. According to both guidelines, for other non-market output the first supplementary principle should never be applied, even when similar products are exchanged for cash elsewhere, e.g. in case of healthcare or education. Other non-market output should always by valued at production costs.

The perception of the current exchange value may differ between the producer and the consumer (or between the employer and employee). In the guidelines, the

point of view taken is always that of the producer. For example, in case of wages and salaries in kind, the goods and services should be valued at basic prices when produced by the employer, and at purchasers' prices when purchased by the employer (that is, the price actually paid by the employer).

The second supplementary principle of valuation is production costs. The production costs are the sum of intermediate consumption, compensation of employees, capital consumption and other taxes on production. Other subsidies on production should be deducted. The production costs do not include interest payments or a mark-up for operating surplus or mixed income. The deduction of other subsidies on production in the 1993 SNA gives rise to problems of interpretation, as its definition of other subsidies on production is not very clear. For example, according to the text it seems to be possible that these subsidies could cover 80 percent of compensation of employees and this would then result in a ridiculous concept of (very low) production costs. The 1995 ESA contains therefore several clarifications and precisions in this respect.

The third supplementary principle of valuation is the net present value. The net present value plays a very minor role in the guidelines. The 1993 SNA states that "Although this method is theoretically entirely justified, it is not generally recommended since it involves many assumptions and as a consequence the outcomes are highly speculative" (1993 SNA, paragraph 3.75). In its slightly contradictory phrasing, the statement pays tribute to the cleavage that has occurred between national accounts and economics at the conceptual level.

3.2. *Net Present Value*

This section investigates the role net present value can play in the national accounts. Net present value is a dominant concept in economic theory. For example, since Hicks' classic book *Value and Capital*, standard micro-economic theory is fully based on the net present value, i.e. the discounted present value of expected future returns. Nevertheless, its role in national accounting is very limited. This is a source of confusion between economic theorists and national accountants, and, as the 1993 SNA reveals in calling it "theoretically justified" (see sub-section 3.1), also among national accounts.

An interesting example is the lecture at the fifth French collogue on national accounting by Malinvaud (1994), a prominent economic theorist, former president of the European Economic Association and former Director General of the French Statistical Office. According to him, the net present value should play a more prominent role in the national accounts. He argues that in some cases the net present value should even replace the value at which items are in fact exchanged for cash ("the market value"), because:

—for many economic subjects, the market value is not directly relevant; they buy, sell, produce and consume mainly as a function of longer term plans;

—most uses of national accounts figures refer to annual or even longer term developments (Malinvaud, 1994, p. 9).

However, the role of net present value is limited in the national accounts for many good reasons.

A first reason is that it can *only be used to value a project or an asset with a distinct stream of revenues and costs*, e.g. an office building or dwelling rented out, bonds or copyrights. The net present value cannot be used to value non-financial assets that are only one of the inputs of a production process. For example, a bulding used to produce television sets. The net present value of this building depends on the net present value of the production of sets (the project). However, the net present value of the building cannot be derived as its contribution cannot be isolated from that of the other inputs. So, for valuation of this building, the net present value is no viable alternative to the current exchange value.

A second reason is that the *value is speculative*, as it depends on the discounting rate used and on the assumptions made about expected revenues (and costs). A different discount rate and different assumptions may result in quite different values. This is the reason given in the 1993 SNA. Furthermore, if the net present value is regarded as an *approximation to the market value*, it is likely to be a biased estimate of the market value; net present value will in general *overestimate* the market value, because:

—a risk-averse entrepreneur will always pay less than the net present value for an asset in order to be compensated for bearing risks;

—a market price will in general not coincide with the maximum a risk-averse buyer wants to pay, but it will be lower, i.e. somewhere between the buyer's maximum price and the minimum the seller wants to receive for the asset.

A third reason for the limited role of net present value in the national accounts is that up-to-date and precise estimates of net present value are *often not used by enterprises and households for deciding on projects (investments/purchase of assets)*.

—For them, it suffices to select out of a limited range of projects the one with the highest net present value. This can often be done without exact calculation of the net present value.

—Furthermore, when a project has already been started, there is no need to make new calculations of the net present value because it would not influence the decision-making process. For example, the project will be continued despite a drastically declined net present value, because there are substantial sunk costs. So, the net present value will at most be used in deciding on new projects.

—In situations of substantial uncertainty, the net present value is not a suitable (sole) decision criterion; general strategic considerations about the developments of the market are then much more important. This applies e.g. for investment in equity.

—Empirical research has revealed that even when the net present value is a useful criterion in deciding on investments, it is often not used by enterprises and households (cf. Faulhaber and Baumol, 1988). For example, enterprises frequently prefer the simpler criterion of pay-back-period.

When the net present value does not play a clear and dominant role in the decision-making by enterprises and households, its merits for statistical description of the value of assets are of course also limited.

A fourth reason is that the net present value is *not very interesting for comparisons over time*, because changes over time in this value can be very

volatile and will reflect no more than expectations on interest rates, relative prices, market power, etc.

A fifth reason is that the net present value is *not well-defined*, because it is not clear which revenues and expenditure should be discounted. From the point of view of enterprises and households, their net present value should also take account of *expected holding gains and the fiscal treatment of revenues*. This applies for example to the net present value of natural resources and equity. However quantification of expected holding gains and fiscal treatments is problematic, as they differ for individual enterprises and households and may also fluctuate rapidly over time. This is another reason for the speculative nature of net present values.

A sixth reason is that the net present values are *ex ante* values and therefore likely to be *inconsistent*. For example, the expectations of the producers of machinery are likely to be inconsistent with the expectations of producers that use such machinery in producing other goods and services. As a consequence, the net present values of transaction between their enterprises will also be inconsistent. The same applies to the net present value of financial assets: their net present values should be estimated on the basis of a consistent set of expectations, e.g. with respect to interest rates, exchange rates and economic growth all over the world. However, some financial assets are even based on the existence of differences in expectations, e.g. options. Only *ex post* values like the current exchange value achieve the consistency required by the national accounts.

The seventh reason is that valuation of assets at net present value *does not really fit in a national accounting system mainly based on current exchange values*. Valuation of assets at net present value is a forward-looking concept of capital stock. It should therefore be accompanied by a forward-looking concept of income. This will be discussed in sub-section 4.2.

3.3. *Production Costs*

In the guidelines, production costs are used to value other non-market output. Furthermore, if no similar items are exchanged for cash elsewhere, market output and output for own-final use are valued at production costs (see sub-section 3.1). *Economic theory suggests that production costs should include interest payments on loans that help to finance the production process*. These loans allow for current production with payment for financing the production process at the end of the production process. For some producers, such loans can be indispensable: without them production would be stopped. Loans can also allow for more efficient production (e.g. by being able to buy better quality machinery) or at a larger scale (e.g. by being able to buy more machinery).

However, according to the international guidelines on national accounting, interest should not be included in production costs. We think this is one of the major flaws of these guidelines and that this should be changed in the near future. In our opinion, actual interest payments should be included as part of production costs for valuing other non-market output and, when necessary, market output and output for own final use. These actual interest payments reflect production costs just as much as compensation of employees. Operating surplus for other non-market output then becomes instead of zero by definition equal to the (net) interest actually paid.

Discussion of the pros and cons of our proposal falls outside the scope of our paper. For some arguments, we refer to Bos (1995, sub-section 5.4).

An advantage of including actual interest payments in the production cost and value of other non-market output is that it is *more consistent with economic theory*. However, from the point of view of opportunity costs, not the actual interest payments should be included but the *interest received if the money invested in the production process would have been invested elsewhere*, e.g. in the form of a deposit. From a theoretical point of view, this alternative seems also the best to attain a *valuation of other non-market output which is best comparable with that of market output*, as the value of the latter contains also a compensation for payments for interest foregone, e.g. in the form of part of the dividends; the other part of the dividends could then be regarded as a compensation for "pure profit."

It is interesting to note that such theoretical principles are already applied in the financial reporting by municipalities in the Netherlands. In these financial reports (muncipality accounts), investments projects are usually valued including an interest charge for the money invested. Furthermore, when some organizational unit has spare money, (opportunity) interest revenues are imputed to this unit. Similarly, when the unit uses up funds of the municipality, interest charges are accounted for.

In the guidelines, interest is treated as property income. It is also possible to regard *interest payments as a payment for services* (see e.g. Sunga, 1984). This alternative treatment has many consequences for the accounting system. One of the consequences would be that interest payments are automatically included in production costs, as they become part of intermediate consumption. Another consequence would be that interest paid on a private savings account becomes a remuneration for production, i.e. for services delivered. According to the present conventions, interest payments consist of three components: payments for financial intermediation services indirectly measured (FISIM), property income paid out of value added ("payment for a factor service") and property income paid but not related to the production process, in particular interest paid by other non-market producers and interest paid to households on their savings account. In contrast, according to the alternative treatment, all interest payments are regarded as a payment for services delivered; this also avoids the classical problem of allocating FISIM to its users.

From an economic theoretic point of view, not only the interest payments but also the opportunity revenue of money invested could be regarded as a payment for services delivered. This is advocated by Diewert (1995, p. 35). A consequence of this treatment would be that the national accounts concept of net operating surplus comes much closer to the economist's notion of "pure profits" (see sub-section 4.4).

4. Income in the National Accounts and Economic Theory

4.1. *Income in the International Guidelines*

In section 4 we will compare concepts of income in the national accounts with some of their economic theoretic counterparts. To this end, sub-section 4.1

provides first a brief overview of concepts of income in the international guidelines on national accounting. In the successive subsections, these concepts of income will then be further discussed and judged on their appropriateness as:

—measures of net return of wealth (sub-section 4.2);
—measures of welfare (sub-section 4.3);
—measures of income as a reward for factors of production (sub-section 4.4).

More discussion on concepts of income in economic theory and national accounts can be found in Bos (1989); Bos and Verma (1992); Bos (1992b) and Bos (1993, pp. 63–70 and 75–80).

In the national accounts, different concepts of income are used for different purposes. The concepts of income *in current prices* are registered in various accounts. Most of these concepts reflect the specific purpose of the account they belong to. The concepts of income directly resulting from the production process are also registered in the supply and use tables.

Following the international guidelines, the production account is shown by industry and by institutional sector. In this account and in the use table, *value added* at basic prices is the balancing item between output at basic prices and intermediate consumption at purchasers' prices. Value added is shown both gross and net of capital consumption. Value added is the measure for the *income generated by production*. The corresponding national aggregate is Domestic Product at market prices. The latter can be derived as the aggregate of output at basic prices by industry (or institutional sector) minus the aggregate of intermediate consumption at purchasers' prices by industry plus net taxes on products. This reflects the output approach for estimating Domestic Product.

In the international guidelines, the distribution of income is set out in three main steps: primary distribution, secondary distribution and redistribution in kind. The corresponding accounts are only shown by institutional sector and for the nation as a whole. The primary distribution of income account shows how gross value added is distributed to factors of labour and capital and to government (through taxes, less subsidies, on production and imports). In fact, the primary distribution of income account is further subdivided into two sub-accounts: the generation of income account and the allocation of primary income account. The generation of income account shows how the (net) value added at basic prices of a producer is distributed over various types of primary income: compensation of employees, taxes less subsidies on production and imports and operating surplus/-mixed income. The latter is the balancing item of this sub-account. In the use table, the information from the generation of income account is also shown by industry. The generation of income account reflects the *income approach* to estimating value added at basic prices and Domestic Product at market prices, i.e. it shows the income components of value added, like compensation of employees and operating surplus.

Domestic Product at market prices can also be estimated via the *expenditure approach*, i.e. as the sum of final uses categories (final consumption expenditure + gross capital formation + exports) minus imports. This identity can also be deduced from the supply and use tables.

Value added at factor cost and Domestic Product at factor cost are no longer standard concepts of income in the international guidelines. Nevertheless they can be derived easily from value added at basic prices by subtracting other taxes less subsidies on production.

The allocation of primary income account shows the remaining part of the primary distribution of income. It records, for each sector, property income receivable and payable, and compensation of employees and taxes less subsidies on production. Operating surplus/mixed income are the resources of the account and the balance of primary income serves as balancing item. At the level of the nation as a whole, the balance of primary incomes is referred to as National Income at market prices. It is equal to Domestic Product at market prices plus the net primary incomes received from the Rest of the World.

For sectors which are important market producers—that is, for non-financial and financial corporations and households—an additional balancing item is shown, *entrepreneurial income*. It is equal to operating surplus/mixed income plus property income receivable minus interest payable and minus rents payable on land or other intangible non-produced assets, e.g. patents.

The redistribution of income in kind account shows the social transfers in kind made by general government and Non Profit Institutions Serving Households (NPISHs) to households. The secondary distribution of income account covers all other redistributions of income, i.e. all current transfers in cash plus all transfers in kind that are not social transfers in kind. The balancing item of this account is Disposable Income. If social transfers in kind received and granted are added, then the result is the balancing item of the redistribution of income in kind account, Adjusted Disposable Income. Social transfers in kind are expenditure on individual services by the government and NPISHs, e.g. expenditure on education, health and culture. This Adjusted Disposable Income concept is one of the major innovations of the new generation of guidelines.

The use of (adjusted) disposable income accounts shows which part of this income is used for (adjusted) final consumption expenditure and which part for saving. Saving serves as the balancing item of the account.

Four accumulation accounts are distinguished in the guidelines: the capital account, the financial account, the other changes in volume of assets account and the revaluation account. The holding gains and losses registered at the latter account can also be interpreted as a type of (negative) income.

The series of accounts is completed by the balance sheet accounts. The balancing item of the Changes in balance sheet account is Changes in net worth, it measures to overall net change in all liabilities and assets. This balancing item can also be regarded as a type of income.

The concepts of income in the accounts are all in current prices. The guidelines also describe how these concepts of income in current prices can be transformed into *volume measures* and *real concepts of income*.

Only some of the concepts of income in current prices discussed above can be transformed into meaningful *volume measures*. This applies in particular to compensation of employees, which can be broken down into a price and a volume measure. For example, the total wage received is equal to the hourly wage rate times the number of hours worked. A more difficult case concerns value added,

as it concerns a balancing item which as such does not have a volume measure. It can be deflated indirectly by taking the difference between a deflated measure of output and a deflated measure of intermediate consumption.

All the concepts of income discussed above can be transformed into real concepts of income in two ways. The first way is to make corrections for *intertemporal* differences in prices, i.e. for changes in prices (e.g. between the base year and the current year). This results in concepts like Gross Domestic Product at constant prices, Real Gross National Income and Real Net National Disposable Income. As with their counterparts in current prices, a clear accounting relationship holds between these aggregates. The second way for constructing measures of real income is by making corrections for *interspatial* differences in prices. A case in point is adjusting National Income for differences in prices between countries by means of purchasing power parities.

Our brief overview has shown that the national accounts contains a whole series of concepts of income in current prices, ranging from value added, operating surplus and compensation of employees to changes in net worth. These concepts are applied at different levels and types of aggregation, e.g. by industry, sector, region and nation. Furthermore, all these concepts of income in current prices can be transformed in real concepts of income and some of them into volume measures. Clear accounting relationships exist between these concepts of income and also between these concepts of income and other concepts in the national accounts (e.g. consistency with the concepts of final consumption expenditure, capital formation, population and employment). As a consequence, statistics from different parts of the accounting framework can be usefully related to each other and meaningful ratios can be calculated, e.g. productivity figures National Disposable Income per capita or government deficit as a percentage of National Income. The detailed transaction classification also allows the construction of alternative aggregates, e.g. to construct Domestic Product at factor cost or to add holding gains to National Income.

All these concepts are based on conventions defined in the guidelines, e.g. with respect to the production boundary, valuation principles, the concept of capital formation and the distinction between current and capital transfers. These conventions give a concrete meaning to the national accounts concepts of income. Without a knowledge of these conventions, the national accounts concepts of income cannot be properly understood. In the following sub-sections, we will therefore also pay attention to this aspect of the national accounts concepts of income.

4.2. *Income as Net Return to Wealth*

The first theoretic concept of income is that of income as net return to wealth. This concept is generally known as Hicksian income, as it originates from Hicks' classic book *Value and Capital.* This concept of income is often misunderstood and it is fundamentally different from the income concepts employed in the national accounts such as National Income.

Hicks' definition of a person's income is "the maximum value which he can consume during a week, and still expect to be as well-off at the end of the week as he was at the beginning" (Hicks, 1946, p. 172). Hicksian income is best understood as a type of real interest on capital stock. Suppose that inflation is absent, that expectations and wants are constant over time and that a person has shares of $1 million on which he receives a 4 percent dividend annually. Hicksian income is then $40,000, because by consuming this amount, he will be as well-off at the end of the year as he was at the beginning.

The most common misunderstanding of Hicksian income is that it includes all holding gains and losses in income (see e.g. 1993 SNA, paragraph 8.15).[5] Nevertheless, Hicks is very clear about his concept of income: "if [holding gains] occur, they have to be thought of as raising income for future weeks (by the interest on them) rather than as entering into any effective sort of income for the current week. Theoretical confusion between income *ex post* and *ex ante* corresponds to practical confusion between income and capital" (Hicks, 1946, p. 179). In terms of our example, suppose that our person has made a holding gain of $500,000 on his shares and that the dividend remains 4 percent of the market value of the shares. Hicksian income is then 4 percent of $1.5 million, i.e. $60,000. Similarly, suppose instead that the person has made a holding loss of $500,000 on his shares and the dividend remains 4 percent of the market value of the shares. Hicksian income is then 4 percent of $0.5 million, i.e. $20,000.

Our example has illustrated Hicksian income with the help of simplifying assumptions. If we gradually relax these assumptions, Hicksian income becomes much more complex. For example, if prices rise, our person will be less well-off when he spends his interest income: Hicksian income will then be less than these revenues. In principle, Hicksian income should take account of many aspects, e.g. expected changes in prices, expected interest rates, uncertain other revenues and life-cycle considerations. Hicks defined his concept of income for a person. If we want to apply this concept to a nation, it becomes even more complicated.

Hicks fully realized that his concept of income was merely a theoretical construct. It is therefore not very surprising that the income concepts actually used in the national accounts differ in many respects from Hicksian income. In contrast to Hicksian income, the national accounts focus mainly on describing the revenues and expenditure during the accounting period. The national accounts make no effort to account for expected revenues and expenditure. The national accounts do not take account of expected changes in interest rates, prices or wants (e.g. due to a changing composition of the population).

The concept of Hicksian income is a product of standard micro-economic theory. Our comparison of Hicksian income with the concepts in the national accounts is therefore a good illustration of the fundamental cleavage between economic theory and national accounts: *the main part of economic theory is in terms of expectations about the future, while the national accounts focuses on describing the present flows and stocks without explicit reference to future events.* This is

[5]However, the latter concept is better labelled as Simons' concept of personal income: "Personal income may be defined as the algebraic sum of (1) the market value of rights exercised in consumption and (2) the change in the value of the store of property rights between the beginning and end of the period in question" (Simons, 1938, p. 68).

also the most fundamental reason why the national accounts has adopted the current exchange value rather than the net present value as its basic principle of valuation.

Hicksian income is a pure and abstract notion which is helpful in theorizing. However it is not suitable for the measurement of complex economies, as in many respects it is still an undeveloped concept. The same applies to interpreting the Hamiltonian as a measure of income (see Weitzman, 1976 and Usher, 1994). In contrast, concepts of income in the national accounts are based on a wide range of specific conventions, which enable the measurement of these concepts all over the world. This can be regarded as the second important difference between Hicksian income and national accounts concepts of income. It is also a general difference between economic theory and national accounting: the guidelines on national accounting provide specific definitions of concepts used in economic theory, like income, production, capital formation, final consumption, collective goods, inflation, lending and employment. In many respects these *national accounting concepts* are not in conflict with economic theoretic notions of these concepts, but they merely *specify what has not been specified by economic theory.*

4.3. *Income as a Measure of Welfare*

In economic theorizing, welfare is the ultimate yard-stick for analysis and judgment. However, the guidelines state explicitly that the major aggregates Domestic Product, National Income and National Disposable Income do not measure welfare (1993 SNA, paragraphs 1.68–1.82; 1995 ESA, paragraph 1.22). This reflects one of the most fundamental principles implied in the international standards for national accounting (see Bos, 1992a, p. 23). As a consequence of this decision, more welfare-oriented measures of product and income belong to the realm of the satellites supplementing the core set of standard accounts (see Eisner, 1988).

When we consider the major national accounts aggregates as a measure of welfare, National Income is evidently a better measure of the welfare of a country than Domestic Product, since the primary incomes received from and paid to the Rest of the World are also taken into account. Similarly, National Disposable Income is a better measure of welfare than National Income, because in addition the current transfers with the Rest of the World are incorporated. However, *the best approximation of welfare in the national accounts is Net change in worth*, as this also takes account of capital transfers, holding gains and losses and other changes in the volume of assets. This aggregate also comes closest to the simplistic (non-dynamic) interpretation of Hicks' definition of income, i.e. the amount you can consume and still be as well-off at the end of the year. Several examples of such an interpretation of Hicksian income can be found in Parker *et al.* (1986). For data users it should be noted that—in contrast to the other aggregates—a practical drawback of Net change in worth is that no regular figures are published (thusfar) for most countries.

Although Net change in worth is the closest the national accounts comes to measuring welfare, it is not often the most suited for analysing welfare for more specific purposes. For example, Domestic Product, i.e. total value added by resident producers, is the most suitable aggregate when analysing the contribution of

production to welfare. It should also be the one for analysing the link between production and the environment. However, for each of such specific purposes, a good understanding of the national accounts conventions and limitations is crucial (see also Bos, 1994). For example, in calculating Domestic Product, other changes in the volume of assets are ignored by definition and several of these are important for the link between the environment and domestic production. This applies for example to depletion of natural resources and catastrophic losses due to abnormal flooding or drought and incidents such as major toxic spills.

Although net change in worth can be regarded as the most encompassing measure of welfare in the national accounts, it still remains a very poor and incomplete measure of welfare. Net change in worth, like all national accounts aggregates:

—ignores many aspects which are very important for welfare. For example, they do not measure all activity outside the production boundary (e.g. unpaid household services, leisure time and natural growth of fish, animals and forests), external costs and benefits not explicitly charged (e.g. pollution and working conditions), the distribution of income and "man's efficency as a pleasure machine" (as a person's happiness/well-being does not only depend on the goods and services consumed but also on the person's capacity to enjoy these goods and services; see Sen, 1979, pp. 12, 13).

—imperfectly measures the importance of several other aspects. For example, the national accounts aggregates add up volumes of goods and services by weighting with their exchange values and not by using the absolute or marginal utility of these goods and services. Another case in point is the national accounts concept of final consumption expenditure: it includes expenditure which should better be regarded as intermediate outputs (the costs of employees to go the place of work or public expenditure on roads and bridges to be partly used by private producers) or as regrettable necessities (expenditure on military defence).

As a consequence, neither of the standard national accounts aggregates should be regarded as measures of welfare.

4.4. *Income as a Reward for Factors of Production*

There is a long tradition in economic thought of distinguishing between different factors of production and corresponding factor incomes, e.g. in specifying production function. Such a traditional distinction by type of factor income could be Pure profit, Wages, Interest and Land rent (Pen, 1971, p. 163). This distinction is in four respects different from the distinctions between the types of primary income recommended by the international guidelines on national accounting.

In the national accounts, firstly, some of these distinctions are not made. For example, "pure" profit and labour income do not exist, because mixed income (the income of unincorporated enterprises) is not split into compensation of employees and entrepreneurial income. The same applies to the operating surplus on the services of owner-occupied dwellings: it can only arbitrarily be dubbed as "profit" or interest. Another example pertains to entrepreneurial income:

it includes "pure profits" plus a remuneration for money invested (see sub-section 3.3).

A second type of difference is that the national accounts explicitly acknowledges that interest payments include also payments for financial intermediation services indirectly measured (as these services are only implicitly charged for). At the aggregate level, a correction is made for this. So, in this respect, the national accounts makes an extra effort to transform the interest payments into a "pure" concept of interest.

A third type of difference is that for other non-market output, production costs do not include interest (see sub-section 3.3). As a consequence, the contribution for the corresponding factor of production is by definition zero according to the national accounts. So, in this respect, the national accounts takes interest not serious as a factor income.

A fourth type of difference is that the national accounts adds some factors of production:

—In addition to Land rent, various other categories of rent (e.g. royalties) are acknowledged;

—Value added is measured at basic prices. As a consequence, the government receives part of value added in the form of other taxes on production. Domestic Product is measured at maret prices. According to this concept, government also receives part of value added in the form of taxes on products. These payments to the government do not fit in the traditional scheme of factors of production.

Economic growth theory explains economic growth in terms of a macro-economic production function with various factors of production. Growth accounting as pioneered by Denison in the 1960s follows this trail set out by economic growth theory. It amounts to analysing national accounts figures on economic growth in terms of changes in factors of production. Growth accounting therefore requires that the national accounts concepts and figures of value added are transformed and explained in terms of changes in volumes and prices of various factors of production. How growth accountants bridge the conceptual gap between the national accounts and the factors of production in economic growth theory is explained by Maddison (1987).

5. Conclusions

National accounting is the statistical language of macro-economic theory. Its international guidelines contain statistical definitions of e.g. income, production, capital formation, final consumption, collective goods, inflation, lending and employment. The national accounting concepts are in this respect *more precise* than their economic theoretic counterparts.

With respect to valuation, national accounts figures *differ fundamentally* from standard economic theory: national accounts figures intend to describe the current exchange values, i.e. the values actually used in exchanging goods, services, labour and assets for cash; they do not intend to describe prices under perfect competition or the discounted present value of expected future returns (net present value).

In cases where there is no exchange for cash, the international guidelines use supplementary principles of valuation: prices of similar items exchanged elsewhere for cash, production costs and net present value (in order of descending preference). However, the concept of production costs in the guidelines fails to fulfil its descriptive role. This can be resolved by also including actual interest payments. This would bring the national accounts closer into line with economic theory.

For specific types of analysis, valuation principles other than the current exchange value or production costs including actual interest payments may be more relevant. This applies e.g. to:

—valuation at net present value;
—valuation at world market prices, e.g. for developing countries and the Eastern European economies in transition;
—valuation at production costs including an opportunity charge for interest foregone;
—valuation at production costs including an estimate of the external costs of pollution;
—valuation of human capital formation at costs of education and training including an estimate of earnings foregone by students (see Bos, 1996a).

However, none of these valuation principles seems to be able to seriously challenge the role of the current exchange value in the system of national accounts: the current exchange value is indispensable as it ensures consistency, is relevant for many purposes all over the world and does not cause the calculation of speculative and arbitrary figures.

The national accounts contain a whole series of concepts of income, ranging from value added, operating surplus and compensation of employees to changes in net worth. These concepts are applied at different levels of aggregation, e.g. by industry, sector, region and nation. Furthermore, all these concepts of income in current prices can be transformed in real concepts of income and some of them into volume measures. Clear accounting relationships exist between these concepts of income and also between these concepts of income and other concepts in the national accounts (e.g. consistency with the concepts of final consumption expenditure, capital formation, population and employment).

The national accounts concepts of income differ from their economic theoretic counterparts, as they are more tightly specified and they:

—are not a net return to wealth;
—are not measures of welfare;
—do not show income as a reward for some specific factors of production.

Some differences between the national accounts and economic theory are fundamental. These differences reflect the fact that both serve a different role. For national accounts *measurement* is indispensable, for economic theory measurement cannot only be an advantage but also can serve as a drawback: why limit economic theory only to what we can measure (reliably)? So, *economic theory may contain concepts which can never be measured* (reliably), like utility and expectations, while the national accounts should necessarily abstain from using these concepts. Furthermore, *economic theory needs to be precise about causal mechanisms and interactions, but can be general in its concepts (e.g. by not defining its concept of*

capital formation). In contrast, the national accounts need not bother about causality and interactions, but is obliged to specify its concepts (e.g. which expenditure are to be recorded as capital formation?) and to put them in an accounting framework.

Better understanding of national accounting concepts will help economic theorists to better understand the figures they use and try to explain. It may also help to increase the role of economic theorists in the development of national accounting. Furthermore, by paying more attention to concepts which are measurable and by studying the consequences of alternative specifications of general concepts, the empirical content and relevance of economic theory can be improved.

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