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Uses of national accounts

**History, international standardization and
applications in the Netherlands**

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Abstract

The national accounts is commonly known by its key-aggregates (e.g. GDP and saving) and their role in public debate and decision-making. However, the national accounts plays many different roles for many different uses. This paper provides an overview of the development of these roles and uses since the seventeenth century. Three periods are distinguished: the early estimates (1660-1930), revolutionary decades (1930-1950) and the era of the international guidelines (1950-present). The paper discusses these roles and uses also much more in detail for one country: the Netherlands, a country which played an important role in modern national accounting and where expert data users, like the CPB, have developed several interesting applications of the national accounts.

Key words: Uses of the national accounts, history of national accounting, history of taxation, economic growth, Dutch national accounts, relevance and reliability of the national accounts, Petty, King, Vauban, Quesnay, Keynes, Clark, Kuznets, Leontief, Tinbergen, Hicks, van Cleeff, Stone, guidelines on national accounting, European unification, macro-economic modeling and forecasting, CPB, SCP, fiscal policy, productivity analysis, performance management, national accounts and welfare, measurement in economics

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Summary

National accounts statistics have made the size, composition and development of national economies and their major components visible. As a consequence, they can be monitored, analyzed, forecasted and used for decision-making. Key-indicators like GDP-volume growth, national income per capita and government deficit as a percentage of GDP, play a central role in managing and analyzing economies all over the world. Many decisions, income and expenditure are directly influenced by national accounts statistics. For example, private and public contracts contain (forecasts of) national accounts indices on price- or volume changes and the contributions to the UN and EU are levied as fixed percentages of national income. For various types of applied economic analysis, e.g. of economic growth, public finance and balance of payments, national accounts concepts and statistics are the standard frame of reference.

This paper describes the development of such roles and uses since the start of national accounting in the seventeenth century. Three periods are distinguished: the early estimates (1660-1930), revolutionary decades (1930-1950) and the era of the international guidelines (1950-present). Tables are included to provide concise overviews of the major developments. The paper discusses these roles and uses also much more in detail for one country: the Netherlands, a country which played an important role in modern national accounting. Several textboxes are used to discuss more specific issues, e.g. the interaction with the budget or the CPB.

The early estimates

All early estimates of national income were practical and directed at concrete policy issues; this was a common feature of national income studies up to the 1920's. The policy issues addressed were national economic power and performance, poverty, unfair and inefficient taxation and sustainability of public finance. Often, several of these issues were discussed and the national accounts approach was essential for demonstrating that the various issues were intimately linked.

War, substantial economic decline and wide-spread poverty were circumstances that stimulated the early estimates. Also the availability of census data or income tax data was important; this partly explains the dominant role of the English estimates.

The ruling class was often not very happy with the national income estimates and the accommodating proposals for reform. Early national accountants were sometimes exiled (e.g. Radishchev in Russia) or fell into disgrace (e.g. Vauban in France); others may have feared the consequences of publishing their work and left it therefore unpublished. However, in the twentieth century -probably linked to advancements made in democracy- estimating national income became gradually to be

perceived as a task of the government. In many countries, also private institutions took the responsibility of regularly compiling national accounts statistics and producing national income studies.

Directly after the first world war, Keynes wrote “The economic consequences of the peace” (Keynes, 1920). This polemic made him instantly world-famous. It is still a major example of the use of national accounts statistics for (economic) policy analysis.

Revolutionary decades

The period 1930-1950 was a revolution in terms of the roles and uses of the national accounts, e.g. the discovery of input-output analysis, purchasing power parities and macro-econometric modelling and the Keynesian revolution in economic thinking. Most of these new uses also reinforced each other. These uses were also closely linked to the economic circumstances: the economic crisis of the thirties, the second world war and the need for recovery afterwards stimulated an active role of the government. National accounts statistics turned out to be very useful in such circumstances for analyzing, monitoring, forecasting, discussing and planning the national economy. These decades were also a revolution in terms of the development of national accounting concepts and compilation methods. For example, the first fully worked out and detailed national accounting system was published in 1947 (the famous annex of Stone in a UN-report).

The era of the international guidelines

Since the fifties, national accounting spreads rapidly all over the world and becomes more and more institutionalized and standardized. National accounts statistics are now regularly compiled by official government institutes, the concepts used are generally those prescribed by the international guidelines, they do not address specific policy issues anymore and have become standard inputs for economic decision-making and analysis in general.

The international guidelines on national accounting have been very important in transferring knowledge on national accounting and stimulating harmonization of the concepts used. In the fifties, a major purpose of the first guidelines was to monitor the success of Marshall-aid. Only very simple tables and accounts were included and they were all in current prices. At present, a fourth generation of guidelines is being drafted. The scope, detail and complexity of the accounting framework in these guidelines has drastically expanded.

The successive guidelines all agreed that national accounts should not aim at measuring welfare, but focus on serving as a practical tool for analysing and deciding on macro-economic policy issues. In the current guidelines, the importance of satellite

accounts is stressed. They can address more specific, functional, policy issues, e.g. health care, the environment and social protection. They can also help to give a more comprehensive picture of the flows and stocks relevant for economic policy and analysis.

The European unification is revolutionising European national accounting. National accounts figures, like GNP, government deficit and GDP-volume growth have been selected to play a special role in monitoring and managing the European unification. This role in European policy has also drastically increased the importance of national accounts statistics in national policy. From a universal perspective, these European developments are in two respects important. Firstly, the development of jurisprudence on the interpretation and application of the international guidelines is a totally new development for the national accounts. Secondly, the European experience gives a concrete example of how the quality and comparability of national accounts statistics can be improved.

Uses of modern Dutch national accounts

The Dutch national accounts are one of the most advanced in the world. They play a major role in Dutch social and economic decision-making since the second world war. Good-quality and independent (national accounts) statistics combined with high-quality analyses and forecasts by independent experts (e.g. the CPB) fit well in the Dutch tradition of consultation and coalition governments.

Tinbergen's econometric model of the Dutch economy of 1936 was the first econometric model for a national economy in the world. It was a stimulus for compiling national income estimates in the Netherlands. In 1939, a very extended set of national income estimates was published for the years 1921-1936 showing the size and impact of the economic crisis in the thirties for the first time. This included a detailed industry-breakdown but no corrections for price changes were included.

The first Dutch system of national accounts was developed by van Cleeff in 1941. He regarded them as the business accounts of the nation, which could be used for normative socio-economic planning.

However, after the second world war, Tinbergen's new mathematical and purely instrumental approach won the day. With the aid of national accounts statistics, the CPB should monitor, forecast and analyse the Dutch economy and should analyse the consequences of policy measures. But the politicians should set the targets and decide on the policy measures to be taken.

Directly after the second world war, there was no role for econometric modelling: the Dutch economy was in ruins and an extensive system of rationing was put in force. A national accounting scheme served therefore as the overall framework to analyse supply and demand. The first CPB model was operational in 1953. It was

explicitly based on national accounting concepts and identities and served as the basis for prediction and policy advice by the CPB for most of the fifties. This was path-breaking, as modelling was elsewhere an academic exercise and considered as not suited for the work of official government institutions.

Following UK-practice, in 1946 the budget of the central government was presented for the first time in a macro-economic framework, i.e. accommodated by a national accounts overview on the Dutch economy. In the sixties, the budget also started to include annexes showing central government expenditure by COFOG-function and by economic transaction. These national accounts classifications were deemed essential for achieving intertemporal and international comparability.

Since the fifties, Statistics Netherlands publishes an extensive set of national accounts statistics: annual figures on economic growth (volume growth of GDP), annual input-output tables, annual sector accounts with detailed overviews on public finance and quarterly accounts. This has been extended towards regional accounts, input-output tables in constant prices using chain indices (already in 1984!), financial accounts and balance sheets, supply and use-tables, labour accounts, quarterly sector accounts and a number of satellite accounts and major incidental studies. Examples are environmental accounts, estimates of the hidden economy, R&D accounts, time use accounts and total factor productivity accounts.

Over the years, various interesting applications or uses of the national accounts have been developed in the Netherlands. In addition to econometric modelling, examples from the CPB are the hybrid-functional classification of government expenditure, the import adjusted method for the decomposition of economic growth, the 'pie' calculation ('who gets which part of the economic growth pie?') and the concept of micro-tax burden. Examples from the SCP are productivity figures on government services and the calculations of who benefits from government expenditure. At Dutch universities, also important work on national accounting has been done, e.g. on the economic importance of unpaid household services in the Netherlands (Bruyn-Hundt), on historical national accounts for the Netherlands (van Zanden) and on international comparison of productivity and growth (Maddison and van Ark; EU-KLEMS).

1 Introduction

The roles and uses of the national accounts have developed over time and have been stimulated by major events, like the economic crisis in the thirties, the Second World War and European unification. In this paper, an overview is provided of these developments in roles and uses over time¹. Three different periods are distinguished.

The period 1660-1930 is labelled as the early estimates (section 2). This period of nearly three centuries starts with the first national income estimates in England and France. All these early estimates were incidental and directed at concrete policy issues.

The second period is very short, only two decades: 1930-1950. But they were revolutionary decades for national accounting (section 3). Major features of this transitory period are:

- The start of official and regular national accounts statistics in a limited number of countries. These statistics were not directed at concrete policy issues, but were intended to provide information relevant more in general for policy and analysis.
- Invention of many new applications and uses of the national accounts approach, e.g. the Keynesian revolution in economic theory and policy, input-output analysis and econometric modelling.
- Revolution in national accounting concepts and methods, e.g. the birth of the first modern national accounting systems;
- Political and economic circumstances favouring a national accounts approach in policy and analysis (economic crisis of the thirties, the end of the gold standard, the second world war and the need for recovery afterwards).

In the third period, we are still living (1950-present). Considering the very important role of the international guidelines, it could be labelled the era of the international guidelines (section 4). Major features of this period are:

- A rapid extension of the number of countries for which official and regular national accounts statistics are available. This is accommodated by the appearance of private and public forecasts of national accounts statistics and their concepts. Decision-makers and researchers become gradually accustomed to using national accounts statistics.
- The publication of international guidelines. This was very important for accumulating and transferring of knowledge on national accounting. It was also important for

1 The best source on early national income estimates is still Studenski (1958); about early English estimates, see also Stone (1997). For the more recent developments, see e.g. Bos (2003a, chapters 2, 3 and 4), Vanoli (2005) and Kenessey (1994). Maddison (2003 and 2005) provides a historical overview mainly restricted to the measurement of economic growth.

harmonizing the concepts used by individual countries in compiling national accounts statistics.

- Major conceptual developments, e.g. about how to measure prices and volumes. In fact, only some years ago, detailed guidelines on measuring prices and volumes in the national accounts were published.
- The development of all kinds of satellite accounts, e.g. on the environment or health care. This implies that the national accounts is not only a tool for macro-economic management, but also becomes a tool for such specific policy areas.
- Political and economic circumstances favouring a harmonized national accounts approach in policy and analysis, e.g. globalisation, European unification, the collapse of communism in Eastern Europe and China and an important role for international organisations (IMF, World Bank, United Nations, European Union).

Despite these trends towards harmonization, there are still substantial differences between the roles and uses of national accounts statistics in countries all over the world and even within the European Union. This applies to the role in public decision-making, the relative importance of specific uses and the division of tasks between the national accounts, official policy reports and research outside the official national accounts. This reflects that the roles and uses of the national accounts depend also on the specific national circumstances, e.g. the political and institutional environment. This issue is illustrated by a discussion of the development of the Dutch national accounts and the interaction with the budget and the CPB.

This paper serves various purposes. The first purpose is to serve as an antidote against simple one-dimensional views on the national accounts, e.g. “national accounts is GDP, GDP is not a good measure of welfare and should therefore not be used for policy-making and analysis”.

The second purpose is to inform economists about the importance of national accounting, about the major recent developments in national accounting and about some interesting applications. This is necessary, because national accounting has become much more complex and a profession separate from economic theory and econometric model building. Better understanding of the national accounts and its (potential) uses, may also stimulate economists to use national accounts statistics more and better and contribute to its further development.

The third purpose is to redirect national accounting towards its major uses. What are the major uses of the national accounts in general and what are those for specific countries with specific economic, political and institutional circumstances? Clarifying these uses can help to make national accounts guidelines and (inter)national statistical programmes much more balanced and effective in view of these roles and uses.

2 The early estimates (1660-1930)

The estimates of national income and wealth by Petty, King and Davenant in England and Boisguillebert and Vauban in France started 'Political Arithmetick' (see table 2.1).

Table 2.1 Major events in the early estimates of national accounting

Year	Event
1660-1710	First national income estimates; in England by Petty, King and Davenant; in France by Boisguillebert and Vauban
1707	First index-numbers by Fleetwood
1760	Tableau économique by Quesnay: economic accounts used as a primitive growth and general equilibrium model; precursor of input-output tables
1770	The concept of value added invented by Young
1790-1800	First national income estimates in Russia
1798-1804	First national income estimates in the Netherlands
1805	First national income estimate in Germany
1823	First national income estimates in constant prices by Lowe
1843	First national income estimates in the USA
1886	First official national income estimates by the government (Australia, Coghlan)
1860-1900	First national income estimates in Austria, Australia, India and Greece
1915	W.I. King (USA): one of the last national income estimates combined with clear policy conclusions
1920	The economic consequences of the peace by Keynes: using national accounts statistics to assess the dramatic economic consequences of a major political agreement
1920-1930	Private institutions start publishing national income studies, e.g. university institutes in Sweden and Norway, USA: Brookings Institutions, NBER, National Industrial Conference Board; Austria WIFO;
1925-1940	More official national income estimates (e.g. Greece, Canada, Soviet Russia, Germany, Netherlands, New Zealand, USA and Turkey)

England

At the end of the seventeenth century, Petty "wanted [firstly] to prove mathematically that the State could raise a much larger revenue from taxes to finance its peace and wartime needs, and that it could do so by more equitable and less burdensome forms of taxation ... Secondly, Petty wanted to disprove once and for all the notion that England had been ruined by the Revolution and foreign wars and was no match, either militarily or commercially, for Holland and France" (Studenski, 1958, p. 27, 28). King also draws clear political conclusions from his estimates:

"the Warr cannot well be sustain'd beyond the year 1698 upon the Foot it now stands, unlesse

1. The Yearly Income of the Nation can be Inceas'd.
2. Or the Yearly Expence Diminish'd.
3. Or a Forreign or Home Credit be Obtain'd or Establish'd.

4. Or the Confederacy be Inlarg'd.
5. Or the State of the Warr Alter'd.
6. Or a General Excise, in effect Introduced." (King, 1936, p. 47).

Nevertheless, Petty as well as King recognised also the more general advantages of estimating national wealth and income. King states that information on a country's wealth and population is a "Piece of Political Knowledge, of all others, and at all times, the most useful, and Necessary" (King, 1936, p. 13). Petty went even further by advocating that in socio-economic discussions "no word might be used but what marks either number, weight, or measure" (Studenski, 1958, p. 27).

The estimates by King can be regarded as improvements on those of Petty. We will shortly discuss the four main features of King's estimates.

Like the estimates of Petty and the earliest estimates in France, King employs a *comprehensive concept of production and income*. This concept is still used in the current international guidelines. According to this concept the production of goods as well as services generates income.

The second important feature of the estimates by King is that they already represented the three ways of estimating domestic product: net production, distribution of income and expenditure. The estimates of Petty and most estimates up till the 1930's only covered one or two ways.

The third important feature of the calculations by King was their remarkable coverage. He presented not only the total annual national income, expenditure, and saving, but also their distribution by social and occupational groups, a breakdown of national income by type of income and an estimate of wealth (gold, silver, jewels, furniture, livestock, etc.). Like Petty, King provided a comparison of the national incomes and wealth of England, Holland and France. International comparison, which is a major objective of the international guidelines, was therefore already present in Petty's and King's pioneering estimates. King's estimates contained also time series of the period 1688-1695 of national income, expenditure and taxes received.

The fourth important feature of King's work is that he used his time series to forecast income, expenditure and tax revenue for the years 1696, 1697 and 1698. This type of use of national accounting figures dates therefore also back to the earliest estimates of national income.

From a modern perspective, the major limitation of King's work is that all estimates are in current prices. The first price index numbers were invented only some years later by Fleetwood (1707)². However, the idea of deflating national income is

2 The issue addressed by Fleetwood was the interpretation of values in old statutes, entitlements, laws and regulations (see Stone, 1997, 117-140). For example, according to fifteenth century college statutes in Oxford, a fellow should vacate his fellowship if he came in possession of an estate by inheritance or of a perpetual pension worth of 5 pounds per year. According to Fleetwood, this rule should be applied while correcting for all price changes during the past two centuries. He

much more recent and originates from Lowe in 1823 (see Studenski, 1958, pp. 107-109).

Lowe used his national income estimates to calculate the tax burden. He related them to the taxable income remaining after deducting the subsistence incomes that could not bear any taxation. He did this for the national incomes of specific years in the preceding three decades, calculated first at current prices and next at prices of 1792. Lowe devoted considerable space to the effects of inflation on fiscal policy. He was particularly concerned over the increase in the burden of public debt on the shrinking money value of national income. He proposed that the government enact a tabular standard that would control the value of money and the payments of interest and wages. This tabular standard was to be based on the “power of purchase” of money in terms of basic commodities and could be applied on a voluntary basis.

For calculating national income, King used net product estimates for agriculture, i.e. he deducted from the revenues of the crop the expenditure on the seeds. However, he did not systematically use value added as a concept. This concept originates from Young (1770; see Stone, 1997, pp. 141-181). For calculating value added in agriculture, he did not only deduct the costs of seed, but also costs of maintenance and repair, e.g. of buildings, vehicles and horses.

France

In France, at the start of the eighteenth century, Vauban proposed a major tax reform (see Studenski, 1958, pp. 55-60). Most of current taxes were to be abolished, as they were inequitable—the small incomes carried nearly all the tax burden—and responsible for poverty. They should be replaced by an income tax, levied at a uniform rate of 5% to 10%, depending on general economic conditions. The income tax should consist of two parts: a levy in kind on agricultural produce and a levy on all money incomes, i.e. on the rent of houses, profits of businesses and grain mills, the operation of public properties, wages, pensions and the fees of government offices. In addition to the income tax, current taxes on salt, postal charges, customs duties and taxes on luxury goods like tea, coffee, chocolate, brandy and gilt coaches should be retained and a tax on wine, cider and beer consumed in public house should be added. He then estimated the potential revenue of his tax reform. To this end, he made an estimate of the major elements of French national income, but did not present an estimate of total French national income. He was also not aware of the need and fairness for tax purposes of distinguishing between the gross and net value of agricultural production.

Vauban was a military engineer world famous for his fortifications and tactics for attacking and defending them. He was decorated by the French king Louis XIV

also mentioned similar problems with the fines for stealing mentioned in old laws and the level of income which entitled to vote in parliamentary elections.

with every conceivable order of distinction. He made his proposals for tax reform after his retirement. However, these proposals were not all appreciated by the ruling class. At the court, Vauban fell therefore into disgrace and he died some months later.

About half a century later, Quesnay published his zigzag-diagram, which is a major precursor of modern input-output tables. Its purpose was “to construct a fundamental Tableau of the economic order for the purpose of displaying expenditure and products in a way which is easy to grasp, and for the purpose of forming a clear opinion about the organization and disorganization which the government can bring about” (Translation by Meek, 1962, p. 108). Quesnay’s Tableau économique was used as a primitive growth model that served to promote the idea that agriculture and not merchandising or manufacturing is the engine of economic growth³. According to the physiocrats, investments in agriculture should therefore be promoted, taxes and interest rates for agriculture should be reduced and tolls and other restrictions on trade in agricultural products should be abolished. The table also served to argue that the most efficient way of taxing is to directly tax the group that ultimately pays the tax, i.e. the landlords instead of the farmers or the artisans⁴. The table was therefore also a simple general equilibrium model.

Quesnay’s Tableau économique is a clear economic accounting model. As such it can be regarded as the first precursor of both the input-output tables and the sector accounts. The estimates by King, Petty and Vauban were systematic, but did not stress the circular flow of income and expenditure and the interactions between socio-economic groups.

The Netherlands

Political arithmetic had a surprisingly slow start in the Netherlands⁵, by far the richest country in the world⁶ in the seventeenth century. In 1798, on request of the national assembly of the new Batavian republic, Hora Siccama and van Rees made a plan for revising the tax system. Their task was to investigate how taxes could be levied efficiently, in proportion to personal wealth, with as low as possible tax rates and sufficient for financing government expenditure. Estimates of national income, government expenditure and current and potential tax revenue were included in the plan. The plan, including a proposal for introducing personal income and wealth tax, was not executed due to a revolt and a change in government.

3 On the interpretation of Quesnay’s Tableau économique as a growth model, see Eltis (1984), in particular the first two chapters.

4 However, the physiocrats were certainly not enemies of the landlords, as they also argued that the net surplus of agriculture should be sufficiently high (e.g. by raising the prices of agricultural products) to pay the taxes and to give them sufficient income.

5 On the history of the Dutch national accounts, see Bos (2006a).

6 In 1700, Dutch GDP per capita was 70% higher than that of England and 130% higher than that of France (see Maddison, 2003, p. 58-59).

In 1804, Metelerkamp published a study of 600 pages on the economic and military power of the Batavian republic over the last fifty years and in comparison with seven other countries (Great Britain, France, Russia, Prussia, Sweden, Denmark and Saxony). The study was published in Dutch and also translated in French. He compared the size of the country, the number of inhabitants, national income, national wealth, imports and exports, income and outlay of the government, government debt and the number of soldiers and warships. However, the comparison of national income was limited to the Netherlands (including Belgium), Great Britain, France and Saxony.

Metelerkamp's study was a reaction to the pessimistic mood in the Netherlands: people thought their country was in decline, full of debt, loosing morale and fighting spirit and with shrinking revenue from international trade and colonies (Metelerkamp, 1804, Introduction, part I). He wanted to investigate whether facts corroborated these feelings and opinions and what policies should be pursued. He concluded that:

- The example of Russia shows that government should interfere at least as possible with domestic trade (hunting, fishing, farming, craftsmanship and commerce); this stimulates employment, income and the supply of products.
- Dutch welfare did not decline during the past fifty years; some sources of income declined indeed, but were compensated by the increase in other sources of income;
- Welfare in other European countries increased. This implied a relative decline of Dutch welfare. However, Dutch welfare still surpasses welfare in other European countries.
- During the last century, government revenue increased in other European countries much more than in the Netherlands. Relatively low taxes may have been the reason for the much more rapid increase in Dutch government debt. However, the tax burden in the Netherlands is now excessive and will in the long run certainly ruin the economy.

Major features of the early estimates

All early estimates of national income were practical and directed at concrete policy issues; this was a common feature of national income studies up to the 1920's. The policy issues addressed were national economic power and performance, poverty, unfair and inefficient taxation and sustainability of public finance. Often, several of these issues were discussed and the national accounts approach was essential for demonstrating that the various issues were intimately linked.

War, substantial economic decline and wide-spread poverty were circumstances that stimulated the early estimates. Also the availability of census data or income tax data was important; this partly explains the dominant role of the English estimates.

The ruling class was often not very happy with the national income estimates and the accommodating proposals for reform. Early national accountants were

sometimes exiled (e.g. Radishchev in Russia) or fell into disgrace (e.g. Vauban in France); others may have feared the consequences of publishing their work and left it therefore unpublished. However, in the twentieth century -probably linked to advancements made in democracy- estimating national income became gradually to be perceived as a task of the government. In many countries, also private institutions took the responsibility of regularly compiling national accounts statistics and producing national income studies. Examples are university institutes (e.g. in Sweden and Norway), economic research institutes (e.g. NBER, Brookings Institution and National Industrial Conference board in USA, Mitsubishi Economic Research Institute in Japan and WIFO in Austria) or private and central Banks (e.g. the Bank of Nova Scotia in Canada). Such institutions reflect the interest of researchers, business, banks, pension funds and trade unions in national income estimates. They need such information for analyzing and monitoring the economy, calculating market shares and deciding on investment, loans, mortgages and wage negotiations.

National accounting had a brilliant start with the work by Petty and King. Since then, progress in national accounting was often slow and small and there were major cases of regress, like the production boundary used.

For three quarters of a century, Smith was very influential in his argument that labourers in agriculture as well as in manufacturing, commerce and the transportation of goods were to be regarded as 'productive'. However, unlike King, he still rated "the whole civil and military personnel of government, the professions, the domestics, and others engaged in the performance of personal services and the services of dwellings" as unproductive labourers. "He considered the national product to be constituted solely of commodities, and the national income ... to be composed of wages, rent and profit (including interest) derived from the production of these articles" (Studenski, 1958, p. 19). Smith's view was supported by among others Ricardo, Malthus, James Mill and John Stuart Mill, but became increasingly subject to criticism by, e.g., Say, McCulloch, Senior, Walras and Marshall.

Despite such unfortunate intellectual detours, at the beginning of the twentieth century, the common stock of knowledge on national accounting had already become considerable. It included for example a comprehensive production boundary treating e.g. agriculture and government services as productive, the notion of three basic ways to estimate domestic product and the concepts of value added and constant prices.

Keynes' The economic consequences of the peace

Directly after the first world war, Keynes wrote "The economic consequences of the peace" (Keynes, 1920). This polemic made him instantly world-famous. He was the official British representative at the start of the Paris Peace Conference, but resigned when it became evident that there was no hope for substantial modification of the draft

terms of peace. He attacked the peace-treaty and the reparation payments imposed on Germany for not taking into account facts and economic logic.

On the basis of all kinds of statistics on national wealth in e.g. Belgium, France, Great Britain and Serbia, he estimated that the treaty implied that Germany had to pay the various allied powers 2 billion pound for direct war damage⁷ and 5 billion for pensions and allowances. He also calculated that Germany's capacity to pay was not sufficient for this. Transferable wealth (e.g. gold, silver, ships and foreign securities) was only about 0.5 billion pound and the rest had therefore to be paid over a number of years out of the net revenue from exports. However, considering the loss of major parts of former Germany (e.g. Alsace-Lorraine) and the loss in capital stock (e.g. ships, livestock, wear and tear due to lack of repair), the transferable part of national income would be less than 0.1 billion pound per year. He proposed to limit Germany's reparation payments well within her capacity to pay, to ensure a fair distribution of coal and iron and to establish a free trade union under the auspices of the League of Nations. Only in such a way, the European economy could be revived, avoid the perils of mass inflation and ensure a proper standard of living for the whole population.

Keynes' polemic could be regarded as a revolt of economics against politics and in this revolt national accounts statistics played a major role. It is still a major example of the use of national accounts statistics for (economic) policy analysis. It marked a radical shift in Keynes thought and its prophetic lessons were learned after the second world war, e.g. the Marshall aid and the European union. All these developments turned out to be very important for national accounting (see sections 3 and 4).

⁷ Considering that much guesswork was included, he argued that the amount would certainly be between 1.6 billion pound and 3 billion pound.

3 Revolutionary decades (1930-1950)

Major changes in uses

In the period 1930-1950, national accounting was drastically transformed. It was a revolution in terms of the use of the national accounts (see table 3.1).

Table 3.1 New applications and uses of the national accounts during 1930-1950

New application or use	Who?
Purchasing power parity: international comparison of real income	Clark
Systematic analysis of long term growth by using national accounts time series	Kuznets
Input-output analysis	Leontief
Econometric modelling of national economies	Tinbergen and Frisch
Keynesian revolution and the birth of macro-economics	Keynes
Analysing public finance in a macro-economic framework	Meade and Stone
Monetary policy linked to national income instead of gold	

Colin Clark (see e.g. Clark, 1937 and 1940) introduced purchasing power parities and showed how to make international comparisons of real income. He also demonstrated how to make intertemporal comparisons. He even made a comparison between the level of well-being in the ancient world (Egypt, Greece and the Roman Empire at the peak of their powers) and that in the nineteenth century and the first half of the twentieth century!

Simon Kuznets⁸ (see e.g. Kuznets, 1941) reconstructed national income and product accounts for the USA, first back to 1919 and eventually back to 1869. Such impressive measurement exercises were the input for investigating business cycles and long term economic growth. For example, what was the role of the various industries, what was the role of technology and innovations, what is the relationship between economic growth and inequality (the U-shaped Kuznets-curve) or between economic growth and urbanization.

Leontief (see e.g. Leontief, 1936) developed input-output analysis, estimated detailed input-output tables for the USA and applied this new tool to all kinds of problems. For example, he estimated the resource costs of conversion to peace time production in 1945 and by calculating the relative factor intensities of imports and exports he discovered the Leontief paradox: why are American exports labour intensive, while American imports are capital intensive?

Tinbergen and Frisch pioneered in econometric model building covering the whole national economy. These models need national accounts data as an input and can be used to analyse or forecast the national economy.

⁸ About Kuznets and his work, see e.g. Carson (1975) and Lundberg (1984).

Keynes published his 'General Theory' in 1936. This launched the Keynesian revolution and gave birth to macroeconomics. This revolution in economic theory had an enormous impact on national accounting. The Keynesian type of analysis established a direct link between economic theory and national accounting as both came to use the same macro-economic identities. The Keynesian type of analysis also threw a new light on the role of the government: a new responsibility for stabilising the economy was added. Accounting for this role of the government became necessary for economic policy analysis. This induced the introduction of accounting per sector, in particular the introduction of a sector government. As a consequence of the Keynesian revolution, the importance of national accounting figures for economic theory and economic policy increased and was more widely recognised.

On Keynes' instigation, Stone and Meade prepared in 1941 UK estimates on national income and expenditure (Meade and Stone, 1941). These estimates were used to present government expenditure and revenue as part of a system of balanced tables describing the whole national economy. In this way, they became a tool in planning the British war economy (Stone, 1951, p. 84; Patinkin, 1976, p. 1109). It also implied a revolution in the practice of government budgeting: since then, in most countries the government budget is presented in a macro-economic framework with explicit statistics or forecasts about economic growth and inflation.

In the thirties, countries left the gold standard. As a consequence, monetary policy needed a new anchor and was linked to national income, e.g. monetary circulation should not exceed four times the national income.

Most of these new uses also reinforced each other. These uses were also closely linked to the economic circumstances: the economic crisis of the thirties, the second world war and the need for recovery afterwards stimulated an active role of the government. National accounts statistics turned out to be very useful in such circumstances for analyzing, monitoring, forecasting, discussing and planning the national economy.

Major changes in concepts and compilation methods

These decades were also a revolution in terms of the development of national accounting concepts and compilation methods. Both revolutions were not independent: they reinforced each other and often also the same persons were involved.

The works by Clark and Kuznets consisted of profound and detailed estimates that were accompanied by elaborate motivations of the concepts and statistical methods used. In the first chapter of "National Income and Outlay" (Clark, 1937), Clark expounds the purposes of national income measurement and its basic concepts. Examples of the latter are his discussion of the inclusion of the services of owner-occupied dwellings, the exclusion of the services of consumer durables, the exclusion

of holding gains and losses and a possible 'deduction for any demonstrable exhaustion of natural resources' (Clark, 1937, p. 9). Kuznets had also a famous discussion with Hick in *Economica* on subjects like the relation between changes in national income and welfare, the valuation of government output and the concept of intermediate and final product (Hicks, 1940 and 1948, Kuznets, 1948b).

Commodity-flow accounting can be regarded as the statistical counterpart of input-output analysis, as commodity-flow accounts are a type of input-output table. Commodity-flow accounting were more or less simultaneously developed in Sweden (Lindahl), Denmark (Kampmann) and the United States (Kuznets).

Clark and Kuznets did not play a role in developing national accounting systems, i.e. a system in which sectors as well as accounts are used in presenting data. Kuznets saw it even as a "dubious addition to the theoretical equipment" (Kuznets, 1948a, p. 154)! The development of national accounting systems occurred simultaneously in Britain, the Netherlands and the Scandinavian countries.

In 1939, the League of Nations had requested for a report with guidelines in order to improve international comparability of national accounting figures, but the war delayed the progress on the report. In September 1944, representatives of the UK, the USA and Canada met in order "to exchange views ... and, if possible, to bring about uniformity in terminology and the treatment of controversial items" (Denison, 1947, p. 3). As a result of this meeting, the national accounts of the United States and Canada were revised, which made them more compatible with the Stone/Meade proposals of 1941 and the British national accounts (see Carson, 1975, p. 177). Immediately after the war, in December 1945, consultations on the United Nations report were resumed. This time also representatives from countries occupied during the war by Germany, like the Netherlands and Norway, could be present. The report was published in 1947 by the UN (UN, 1947) and consisted mainly of an appendix by Stone (1947).

This appendix can be regarded as the first fully worked out and detailed national accounting system (see Aukrust, 1986 and Carson, 1975, p. 178). Furthermore, the report was also path breaking in that it contained for the first time international recommendations on national accounting. However, the report should not be regarded as the first official guidelines of the United Nations: it was not approved by the statistical commission of the United Nations as official guideline, but referred to as a useful technical report; it was also not used as a guideline for submitting data to the United Nations.

4 The era of the international guidelines (1950- ...)

The successive guidelines

On request of the OEEC, in 1951 a guideline on national accounting was written which was to be used in planning the Marshall-aid. This guideline and its two immediate successors (1952, OEEC and 1953, UN) can be regarded as the first generation of official international standards. In contrast to the 1947 UN report, rather simple accounting systems were aimed at. In fact, a systems approach was nearly absent as only some aggregates and their composing parts are to be compiled; the financial flows in the national economy are even nearly fully ignored.

Table 4.1 The successive guidelines on national accounting

1947	Technical report by the UN containing recommendations; including the famous annex by Stone: the first detailed and fully worked national accounting system
1951-1953	First generation of international guidelines: OEEC guidelines of 1951 and 1952; UN guideline of 1953 (SNA53); very simple tables and accounts
1968-1970	Second generation of international guidelines: UN guideline of 1968 (SNA68), the European guideline of 1970 (ESA70) and the Material Product System of 1969 (MPS69) for communist countries
1993-1995	Third generation of international guidelines: joint guideline of 1993 by the international organizations (SNA93 by UN, IMF, World Bank, OECD and EC) and the European guideline of 1995 (ESA95)
2008-2010	Fourth generation of international guidelines: updates of the joint and European guidelines

A second generation of official guidelines was issued at the end of the sixties and beginning of the seventies. It consisted of two guidelines by the UN: the Material Product System (MPS69) used by communist countries and the System of National Accounts of 1968 (SNA68) used by the rest of the World. For the special purposes of the European Communities, also separate guidelines were issued for EC-countries, i.e. the European System of economic Accounts of 1970 (ESA70). The SNA68 and ESA70 followed mainly the trails set by their predecessors but greatly expanded the accounting system, e.g. by including also input-output tables and constant prices. The MPS69 differed fundamentally from all the other guidelines by its anachronistic concept of production that focuses on measuring only material production⁹. Nevertheless, with respect to the other concepts and the scope covered, the MPS69

⁹ Studenski (1958, p. 22) argues that the production boundary in MPS69 is based on the ideas of Marx, and more in particular on a mistaken interpretation of it. However, also Adam Smith advocated a material production concept (see section 2). So, it could be argued that the communist guidelines were not actually based on the ideas of Marx, but on those of the intellectual father of capitalism, i.e. Adam Smith!

was sometimes even more advanced than the SNA68 and ESA70 (e.g. total consumption of the population).

In 1985 Richard Stone was awarded the Nobel prize in economics for his contributions to the national accounts, in particular for his leading role in the development of the first and second generation of international guidelines.

Table 4.2 Major changes in the scope of the successive universal guidelines

SNA53	Simple set of tables and accounts in current prices
SNA68	Extended accounting system, including input-output tables and general principles on prices and volumes
SNA93	Inclusion of balance sheets, employment and purchasing power parities More detailed accounting structure (more accounts, more sub-sectors and detailed supply and use tables) Separate chapters on satellite accounts and flexible adjustments for national circumstances Detailed discussion of general principles on prices and volumes (e.g. chaining and index formulae)
SNA08	More detailed discussions of many topics, e.g. government accounts, the informal sector and capital services (important for productivity measurement) But no detailed discussion of price and volumes by industry/product and no separate chapters on quarterly national accounts and regional accounts (unlike ESA95 and its forthcoming update)

In the mid nineties, a third generation has been issued, the SNA93 and ESA95. The SNA93 and ESA95 have again greatly expanded the scope of the international guidelines by including e.g. balance sheets, purchasing power parities, satellites and Social Accounting Matrices. A revised version of the MPS69 was not necessary due the collapse of communism in Eastern-Europe. All countries in transition in Eastern Europe are now implementing the SNA93 and, for those who want to apply for membership of the EU, the ESA95.

At present, the major part of a new update of the SNA has already been finalized, while work is still to be done on some chapters. The updating process of the European guidelines has just started and the final draft is intended to be completed in 2009.

Next to the official guidelines on the national accounts, over the years many other reports, handbooks and guidelines have been published on specific parts of the national accounts. Recently, more specific guidelines have been issued on e.g. price and volume measurement (Eurostat, 2001), quarterly national accounts (Eurostat, 1999) and input-output tables (Eurostat, 2008). A very welcome novelty is that also the users' perspective (how to use the national accounts for analysis?) starts to be addressed, e.g. by the guidelines on productivity analysis (OECD, 2001), by the EU-KLEMS-project for detailed and internationally comparable productivity data and analysis by industry and by the report on national accounts and policy analysis (UN, 2002).

By their rapid expansion of scope since the guidelines of the fifties, the most recent set of guidelines have incorporated most of the major innovations in national accounting since the Second World War. If we disregard the MPS69, basic concepts in the guidelines have shown a remarkable consistency, e.g. excluding the services of unpaid household services. Some of the criticism on unchanged basic concepts has been met by introducing satellites, e.g. on the link between environmental indicators and national accounts statistics. Nevertheless, some important changes in concept have also occurred, e.g. the introduction of chain indices or the expansion of the concept of capital formation to include software and mineral exploration.

For decades, the international guidelines on national accounts statistics were partly inconsistent with the international guidelines on three specific types of macro-economic statistics: balance of payments, government finance statistics and statistics on employment and population. However, (nearly?) all these inconsistencies have now been resolved.

Also the links with international statistics on specific policy areas (e.g. health care, social security, environment) have been improved. International guidelines on these specific statistics explicitly refer to the national accounts concepts and classifications, discuss similarities and differences and propose satellite accounts to bridge the gap between the national accounts and these specific policy areas.

The role of the international guidelines

International guidelines have been influential for many reasons. Firstly, the leading international experts of the profession have developed the systems in the international guidelines. They are therefore relatively well thought out and it is costly, time consuming and not easy to invent an alternative system. Secondly, by keeping in line with the international guidelines, national figures can be compared with figures from other countries. This is important, as international comparison is a major use of national accounting figures. Thirdly, in many countries, the national accounts have been set up by or improved with help from the international organisations issuing the guidelines (UN, OECD, EU) or with help from countries advanced in national accounting (Sweden, France). In the latter case, following the international guidelines is usually stimulated to the extent that the helping countries follow them. Fourthly, we mention that all countries are obliged to compile some figures on the basis of the international concepts. In the EU, due to some important administrative uses, the guidelines are even legally binding; the same applies to the statistical programme linked to these guidelines. The fifth reason is that the data submitted to the international organizations play a central role in international policy discussions and decision-making, e.g. about accession to the European Union, granting loans or paying contributions to the international organizations. To link national discussion and

decision-making to this international context, the international concepts have to be used for national purposes as well.

The international guidelines are very successful in standardising the concepts and classifications used in compiling national accounts figures. The guidelines achieved that all over the world official figures came to be based on uniform notions of the production boundary, asset boundary, the distinction between intermediate and final consumption, etc. This is evidenced by some of the earlier country practices. They all differed fundamentally from the basic concepts in the successive guidelines.

In Sweden in 1937, Lindahl published two alternative estimates of national product, one including the services of unpaid household services and one excluding. However preference was given to the latter. In Norway in 1946, the value of unpaid household services was included in output and national product. However, since 1951 they are excluded (see Aukrust, 1994). In some official Scandinavian studies (1937, 1951, 1953), the services of consumer durables like cars were included in output (see Aukrust, 1994). In France, until 1975 when the ESA70 was implemented in the French national accounts, the value of the output by banks, insurance companies and general government was not included in output and domestic product (1971 base; see Demotes-Mainard and Bournay, 1994). Due to the influence of the international guidelines, country practice to include in the national accounts' estimates unpaid household services and the services of consumer durables was gradually extinguished.

However, as the French case shows some drastic differences between country practice and the international guidelines existed unto the seventies. Furthermore, if we look at the changes in the international concepts, some important differences continued to exist for many years.

Welfare and the guidelines

The successive guidelines all agreed that national accounts should not aim at measuring welfare, but focus on serving as a practical tool for macro-economic policy issues (e.g. public finance, balance of payments, distribution of income in terms of profits and wages). In the late sixties and the beginning of the seventies, national income was frequently criticised for not being a welfare measure (e.g. Mishan, 1969). However, the authors of the international guidelines did not intend to provide a measure of economic welfare. For example, Jaszi even regards as one of his principal contributions to have resisted successfully to "the will-o'-the-wisp of forging national output into a measure of economic welfare. I was a minority of one in a company that included such mental giants as Simon Kuznets and John Hicks, and at one point I had to defy a forceful Secretary of Commerce who had instructed the BEA [Bureau of Economic Analysis of the USA] to prepare a measure of welfare" (Jaszi, 1986, p. 411). According to Okun, "[the] beauty of ... present practice is that no sensible person could

seriously mistake the GNP for [a measure of total social welfare]" (Okun, 1971, p. 133).

In 1972, Nordhaus and Tobin (1972) illustrated in an impressive way what accounting aimed at measuring welfare would imply. They calculated a Measure of Economic Welfare (MEW) by modifying traditional national income figures in several respects. For example, they deducted an estimated value of the disamenities of urbanisation and they added tentative estimates for the value of unpaid household services. Since then, many measures similar to MEW have been calculated (see Eisner, 1988). Frequently, these measures were presented as part of extended or total accounts. Measuring the contribution of economic activity to welfare is only one of the reasons for drawing up such accounts. Some other motives are to obtain: "more inclusive and relevant measures of capital formation and other factors in economic growth, and better and/or additional data to fit concepts of consumption, investment, and production relevant to economic theory and structural econometric relations" (Eisner, 1988, p. 1612).

The increased use of social indicators like the Human Development Index (UNDP, 1991) is a somewhat related development. In these social indicators, national income (per capita) is only one of the variables, other variables being e.g. infant mortality, life expectancy and adult literacy rates. In contrast to measures like MEW and National Income, social indicators are not measures in money terms; they serve solely as indexes.

Differences in national accounts practice all over the world

Under the influence of the international guidelines and the international organisations, national accounts statistics are now available for all countries. For most countries, they have also gradually extended in scope and detail. Nevertheless, still enormous differences in scope, detail, quality and frequency exist between the national accounts statistics published by countries. This applies even to a rather a homogeneous block of countries, like the EU.

For example, since the fifties countries like Norway, Denmark, the Netherlands and France¹⁰ publish annually input-output tables. Input-output tables were incorporated for the first time in the international guidelines in the SNA68 and ESA70. However, even now, several decades later, only a few more countries publish annually input-output tables. For a somewhat larger group incidental but usually rather outdated input-output tables exist. This applies e.g. to the USA. A similar story can be told for the detailed sector accounts proposed by the SNA68, the ESA70 and the most recent

10 A very interesting survey of the post-war developments in France can be found in Demotes-Mainard and Bournay (1994). A more extended overview is given by Vanoli (2005).

international guidelines. Even now, a great majority of the countries in the world only apply rather simple accounting systems of the SNA53-style.

Substantial differences in country practices exist also with respect to specific national accounts statistics, like regional accounts, quarterly accounts, satellites and balance sheets. In some countries, all of them are regularly published (e.g. in the Netherlands, France and Canada). In a somewhat larger group, some of them are regularly published, while in most countries hardly any data are regularly published on any of these topics.

Our remarks with respect to the input-output tables and the sector accounts reveal that most of the international guidelines have been much more ambitious and encompassing than the national accounting practice of their time. This partly reflects their role as a pedagogical device and innovative instrument¹¹.

However, in the case of the USA it may also partly reflect a fundamentally different view on the role and design of the national accounts. In line with USA national accounts practice, two quotes from American economists stress the importance of a relatively simple set of accounts and criticize the complexity and cost-inefficiency of universal accounting framework:

“These ... accounts are designed to answer “Who does What by means of What for What purpose with Whom in exchange for What with What changes in stocks?” Given this level of complexity, there is a distinct danger that when the revised SNA is actually put in place, it, like the Hubble telescope, may not be successful in bringing into focus a clear view of what it was designed to examine. Only professional national accountants will be able to fathom the national accounts. Furthermore, the establishment of such an elaborate system as the standard to be adopted by national and international statistical offices may result in the SNA becoming a statistical behemoth independent of its creators and with an illogic of its own-not unlike a Frankenstein monster. One of the major virtues of national accounting systems used by many countries is that they do provide a relatively simple macroeconomic overview of the economic system” (Ruggles, 1990, p. 419).

“For every series of any real interest that is developed, at least a dozen series of trivial or no value must be estimated to fill out the “accounts”. Because most of the series called for are of no appreciable interest, existing systems of data collection do not provide the information required by the new SNA (F.B.: SNA68); either collection of trivial data would be required or the number would have to be imaginary. The new SNA has another weakness: it is so complicated that not even serious and expert users of national income and product data (and few producers for that matter) can be expected to understand it or the meaning of the numbers it is to contain. A very simple

¹¹ It also reflects the totally different amounts of resources in countries available for statistics in general, and for national accounts in particular.

set of accounts..., supplemented by supporting tables to provide analytically interesting detail and alternative breakdowns, is a far better approach, in my opinion” (Denison, 1971, p. 38).

European unification

The ongoing European unification is revolutionising European national accounting¹². National accounts figures, like GNP, government deficit and GDP volume growth have been selected to play a special role in monitoring and managing the European unification (see also table 4.3). This role in European policy has also drastically increased the importance of national accounts statistics in national policy. In discussing and deciding on the national budget, national accounts statistics on the government deficit have become the central figures in all EU-countries. They have often taken over this role from specifically nationally defined concepts (see text box). The Member States and the European Commission have been aware that the national accounts statistics did not suffice for such usage. They have therefore launched an ambitious programme for improving the quality and comparability of present national accounts figures and for drastically extending the set of national accounts statistics that are available for all EU-Member States.

From a universal perspective, these European developments are in two respects revolutionary. Firstly, the development of jurisprudence on the interpretation and application of the international guidelines is a totally new development for the national accounts. Secondly, the European experience gives a concrete example of how the quality and comparability of national accounts statistics can be improved.

Table 4.3 Use of national accounts statistics for European policy

Policy area	Which national accounts statistic?
Monetary policy and public finance	Government deficit and debt as a percentage of GDP Financial accounts showing e.g. the size of new mortgages and loans by corporations
Productivity and growth policy (Lisbon agenda)	Economic growth, expenditure on Research and Development as a percentage of GDP
Social policy	Social protection statistics closely linked to national accounts concepts
Regional policy	Regional product per capita is yardstick for granting regional funds
Agricultural policy	Agricultural accounts showing also the development of farmer income
Development aid	Low domestic product per capita is a yardstick for granting aid
Defense policy	Expenditure on defense as a percentage of GDP
Maximum total expenditure by EC	Percentage of GNI (about 1%)
Member states contribution	Percentage of GNI (but some other EC-own resources exist, e.g. import duties)

¹² For a more extended discussion see Bos (2003a), pp. 34-38.

Textbox 4.1 European norms for actual deficit and debt

The treaty of Maastricht in 1992 implied that monetary policy became a responsibility of the European central bank and that national fiscal policy should comply with the European norms of actual deficit and debt. Deficit should not exceed 3% GDP and debt must be below 60% of GDP or be declining towards the 60% norm at a satisfactory rate. According to the Stability and Growth Pact, the budget balance should be close to balance or in surplus in the long run.

As a consequence, the national concepts on public finance were replaced by the new European concepts based on the national accounts. This had several practical implications:

- A change in concepts. For example, according to the national account's concept of budget balance, revenue and expenditure like taxes and interest payments should be recorded on a transactions basis. Financial transactions like loans and the sale of equity are irrelevant and the government includes not only the state and social security funds, but also municipalities, provinces and many other non-market units mainly financed and controlled by the government.
- The concepts cannot be changed anymore over time by the government.
- A link to national accounts statistics and therefore a new role for national Statistical Offices and a more limited role of Ministries of Finance. The official figures reported to the European Commission and European Central Bank should be consistent with those reported by the national Statistical office. In the end therefore, statistical offices are responsible for translating the general European concepts into operational concepts for their country and to make the best estimates for these operational concepts.

The transition towards European concepts does not imply that bookkeeping and bookkeeping tricks have become irrelevant. Like all national concepts of taxable income, the European concepts on public finance can affect actual behaviour (e.g. stimulate leasing of capital goods to reduce the deficit or stimulate the sale of public equity in order to reduce public debt) and the specific institutional arrangements chosen.^{a)} Furthermore, they are not optimal from an economic-theoretic point of view (e.g. not forward looking and ignores financial assets and implicit liabilities like future pensions) and may not well take account of the current economic situation in a country. They are the outcome of political negotiations in view of the circumstances in Europe in 1992 and the purposes of the criteria, i.e. to provide signals that countries are willing and able to live with the discipline required by EMU (see Bovenberg and De Jong, 1996, p. 18).

a) On the merits and limitations of the EMU-targets of government deficit and debt, see also Bos (2003a, chapter 8) and Bos (2007b).

5 The uses of modern Dutch national accounts

This section describes and discusses the uses of the Dutch national accounts since the start of the twentieth century.¹³

The estimates by Bonger

In 1910, professor Bonger presented estimates of national income and wealth for the Netherlands for 1894/1895 and 1907/1908 (Bonger, 1910). His purpose was to give an impression of the development of income and wealth in this period. The estimates were derived from the in 1894 introduced wealth and business income tax. Bonger's figures did not include estimates for wages and business income exempted from taxes, like low business incomes and income from agriculture. They should therefore be regarded as estimates of taxable national income and wealth. More than a decade later, Bonger updated these estimates and also introduced corrections to arrive at an estimate of national income (Bonger, 1923). The corrections included an assumption of 10% fraud and estimates for labour income exempted from taxation and undistributed profits.

van Cleeff's business plan for the nation

In 1941, the religious socialist¹⁴ van Cleeff presented a simple set of accounts for the Dutch economy of 1938. Four sectors (trade, enterprises, government and consumers) and five accounts (a cash flow account, a financial account for shares, a commodity flow account, an income and outlay account and profit account) were distinguished in a simple double-entry bookkeeping system. The figures were rather crude and the detail in the transactions very limited. For example, revenue by the government consist only of 'taxes', 'taxes' are only paid by consumers, government expenditure is limited to 'various income components' and no transactions with the rest of the world are shown.

Van Cleeff's purpose was to demonstrate that it is possible to present a concise and systematic overview of the national economy. Provided sufficient statistics are available, this overview could be meaningfully elaborated in many respects. He

13 For the period before 1900, see Bos (2007a). That paper provides also a more elaborate overview of the history of the Dutch national accounts in terms of conceptual changes and the quality, scope, timeliness and detail of the data available; it also discusses the so-called Dutch view on national accounting. However, this paper is much more elaborate on the roles and uses of the Dutch national accounts (e.g. the interaction with the CPB and the budget) and covers also the most recent developments. About the interaction between the Dutch national accounts and the CPB, see also Verbruggen and Zalm (1993).

14 Religious socialism is the framework of thought of the Woodbrooker's Labourer's Society. Religious socialists favour a socialist society fulfilling three criteria. First, society should be a democracy. Second, the realm of socialism should be extended from merely labourers to farmers and the middle-class. Thirdly, society should be founded on moral and ethical instead of materialistic principles. The religious socialists, like van Cleeff, van der Goes-Naters and Wiardi Beckman, were a major group within the Dutch social democratic labour party. At present, religious socialists are not important in the Dutch labour party. However, outside the Netherlands religious socialism is still well alive, cf. the UK's prime minister Tony Blair and Sweden's prime minister Persson.

mentioned further specification of the various purchases and expenditure, adding a breakdown by industry or region and including a national balance at the begin and end of the year.

Table 5.1 Major events in Dutch national accounting 1900-1980

Year	Event
1910-1923	Bonger: estimates of national income and wealth based on income tax data
1936	Tinbergen's first econometric model: no national accounting scheme But stimulus for compiling national accounts statistics
1939	First extended set of official national income estimates, including detailed industry breakdown (Derksen)
1941	van Cleeff's business accounts of the nation: crude figures, hardly any detail
1944	First operational set of accounts (Derksen)
1946	Government budget presented for the first time in a macro-economic framework (=national accounts)
1946-1952	CPB describes, analyses and forecasts Dutch economy using a national accounting scheme
1950	First extended set of official national accounts (Oomens), including input-output tables, revenue and expenditure of the government plus detail e.g. on taxes and description of sources and methods Start of quarterly accounts
1953-1955	CPB: First macro-models are operational, based on national accounting scheme, used for forecasting and policy analysis, stimulus for more timeseries
1954	First national income estimates in constant prices, e.g. economic growth
1958	Revised national accounts for 1948-1957, now complying with the international guidelines (SNA53)
1960	Start of five yearly regional accounts
1962	Government budget: Functional classification (COFOG) and classification by transaction
1974	Start of annual regional accounts

van Cleeff's system of national accounts was inspired by the analogy with the business accounts and by his ideas on planning and organizing the national economy. He compared the national government with the directors of a big firm, regarded the national accounts as the business accounts of the nation and stated that the government should draw up a business plan for the nation. The national accounts should therefore play a major role in the socio-economic planning advocated by van Cleeff.

Socio-economic planning was presented as an alternative to an unorganised capitalist economy and a communist economy. The economy should be organized as a firm, but -in contrast to communism- individual norms, values and wishes for personal development should be respected.

After the Second World War, van Cleeff joined Tinbergen at the newly founded Central Planning Bureau (CPB). He started as head of department I "Research on Economics of Planning" (Planhuishoudkundig onderzoek). His views on planning were ideologically the basis for the first years of the CPB. However, Tinbergen's new ideas on planning and the role of the CPB gradually started to dominate. In 1949 van Cleeff's department disappeared and became a much smaller group called "boundary field between economics and sociology". Since then, due to the increasing emphasis on macro-econometric modelling within the CPB, van Cleeff was playing only a role

on the sideline (see Van den Bogaard, 1998, pp. 55-59). His normative approach of planning had lost the battle with the new mathematical and instrumental approach developed by Tinbergen.

Tinbergen's econometric model

From 1927 Tinbergen worked at the CBS¹⁵, where he joined the business cycle research unit. The CBS gradually moved away from economic barometers and started to focus strictly on particular branches of industry. Tinbergen introduced econometric analysis in this research, e.g. econometric studies on the supply and demand for potato flour and ships. In 1933, he investigated the interaction between unemployment and wages. In 1936, Tinbergen constructed an econometric model for the Netherlands (Tinbergen, 1936). This was a pioneering achievement, as it was the first econometric model of the business cycle covering the whole economy.

His stylized representation of the Dutch economy was not intended to detect the causes of the economic crisis in the Netherlands. Unlike religious socialists as van Cleeff, the socio-economic order was not a topic of study but taken as a given. The purpose was purely instrumental: to find the conditions which could bring about an improvement of the business cycle. He compared various policy measures, like devaluation, public works and reducing wages. His famous conclusion was that devaluation was the best policy. This was very much against the politics of the time, i.e. not only against the official policy of the government but also against the opinion of the socialist party.

At a meeting of the Dutch economic association also Tinbergen's method was ridiculed and labelled the 'night train'. According to professor Goudriaan, "we have been transported on the night train of his mathematical machinery, but I am convinced that one of the carriages has been uncoupled during the night and has brought us to a station that we would never have reached through realistic economic insights" (Jolink, 2003, p. 136).

Nevertheless, in September 1936, the guilder was devalued without the disastrous consequences that had been predicted by many. This contributed enormously to the reputation of Tinbergen and his new method.

Tinbergen's revolutionary model of 1936 was not based on a national accounting scheme, e.g. concepts like national income and final consumption by the government were absent. Nevertheless, it gave the development of national accounting in the Netherlands a head start. In order to provide a better empirical grounding to the econometric model, new and longer time series were needed and the quality of existing

15 This started as a substitute for a military service. His social service was initially at the administration of the Rotterdam prison, but he successfully lobbied for being transferred to the CBS. In 1928, he left the CBS for writing his PhD thesis and he returned in 1929.

estimates was to be improved. This was the major reason for compiling new and better figures.

A national accounting scheme for planning and forecasting the Dutch economy

After the Second World War, the Central Planning Bureau (CPB Netherlands Bureau for Economic Policy Analysis)¹⁶ was founded with Tinbergen as its first director. However, in the early years, there was no role for econometric modelling. The Dutch economy was in ruins and an extensive system of rationing of imports, consumption and investment was put in force to make the most out of what was available. A more or less refined model implicitly assuming free interaction among the major economic variables was then of little use. Instead, a national accounting scheme ('the national budget') served as the overall framework to analyse supply and demand.

Starting from 1946, following UK-practice (see Meade and Stone, 1941) an update of this scheme was also included in the government's annual report on the government budget. In this way, the government budget was presented in a macro-economic framework.

In the Central Economic Plan of 1946 (CEP1946), first total production was estimated on the basis of the total number of labourers and their labour productivity while taking into account bottlenecks like the lack of capital in one branch or the lack of labourers in another branch. When the total supply of goods and services was known approximately, the demand for these goods and services was investigated for private consumption at subsistence level, other private consumption, restoration and investments and the government.

The methodology of the CEP1947 was quite different from the 1946 plan. It was much more detailed and was built up of separate plans made by governmental agencies for the various branches (e.g. textile, coal and metal). The separate plans were totalised, checked on their consistency and modified in order to bring them in line with the level of the estimated possibilities of consumption, investment, imports and exports. This use of a national accounting scheme for bottom-up planning fitted well with van Cleeff's ideas on planning.

However, as recovery proceeded, the extensive rationing system was gradually relaxed. As a consequence, the modelling approach and taking account of economic behaviour became much more meaningful. Furthermore, a model could focus on addressing the major policy issues.

¹⁶ The unique role of the CPB in the Dutch fiscal framework is described in Bos (2007a). Overviews of the successive CPB models are provided by Barten (1991) and Don and Verbruggen (2006). For a general overview of the history of the CPB, see Passenier (1994).

The start of econometric models as official tool for analysis and forecasting

The first CPB-model was operational in 1953.¹⁷ It served as a basis for prediction and policy advice by the CPB for most of the 1950s. This was path-breaking, as modelling was elsewhere an academic exercise and considered as not suited for the work of official government institutions.

The 1955 model consists of 27 equations describing the major macro-economic aggregates as defined by the system of national accounts. Compared to the 1936 Tinbergen model, it takes a step forward in its compatibility with the national accounts, its use of cumulated cost shares from the 1938 input-output tables and in the explicit presence of policy variables. However, it scores lower because of the virtual absence of dynamics, the very limited price-quantity interaction and the somewhat weaker empirical basis.

The model was used to draft a table indicating the consequences of particular measures of economic policy ('a railway table'). For example, the effect of an indirect tax or wage increase on employment, investment, consumer prices and the current account of the balance of payments. The table enabled decision-makers to choose their favourite policy menu. The table reflects Tinbergen's new view on planning: policy makers should define the targets of government policy and a model should be used to investigate which instruments are the most effective and efficient in meeting these targets. This approach was extended and formalized in his book "On the theory of economic policy" (Tinbergen, 1952). This book stresses also that politicians should be aware that one policy tool can not serve to achieve two policy targets simultaneously. More in general: the number of policy tools should be at least as large as the number of policy targets.

Tinbergen's purely instrumental approach fitted very well in the Dutch pillarized society, where the four pillars (catholics, protestants, social democrats and liberals/free) all had their own organizations, like political parties, trade unions, employers' organizations, newspapers, sports clubs, schools and universities. After the Second World War, all pillars agreed that a national economic policy was required for economic recovery. This required pillar and class neutral insights. The national accounts framework and Tinbergen's modelling approach provided these.

Like the Tinbergen model, the 1955 model stimulated to extend and improve the available data. A joint effort of CBS and CPB resulted in a database for the interwar period (1922-1939).

17 The 1955 model, published an annex in the CEP1955, see Barten (1991) and Don and Verbruggen (2006).

The first extended set of official national income estimates

Under the supervision of Derksen, later chief of the National Income Unit of the United Nations, national income estimates for the period 1921-1936 were published in 1939 (CBS, 1939). It made the size and impact of the economic crisis in the thirties for the first time visible in a systematic and complete way. The figures were not only estimated by Bongers' income method but also estimates for the production method were introduced. However, no estimates were presented for the expenditure method and the supply and use of goods and services. Furthermore, no corrections were made for price changes. As a consequence, also no economic growth figures were presented. In the production method, thirty-one industries were distinguished. The method was quite advanced and inspired by the work of Colin Clark.

From the first operational set of accounts to a very extended set of accounts

Following the suggestion of van Cleeff (1941), in January 1943 a 'Commission for the National Bookkeeping' was established to develop a regular system of national accounts statistics. The Commission was made up of 6 members, the chairman was Idenburg, Director-General of the CBS, and amongst the members were Tinbergen and Derksen (secretary). Profitable use could be made of the work done by Frisch and a copy of Leontief's *The Structure of the American Economy*. However, the important work by Meade and Stone (1941) in England, who embedded the government budget in a set of macro-economic accounts, became only known after the Second World War. Rapid progress was made and already in September 1944 a fully operational set of national accounts was available for 1938 (Derksen, 1944). Immediately after the war, Derksen prepared a paper "A System of National Book-keeping – Illustrated by the experience of the Netherlands Economy" (Derksen, 1946) to summarize the work done and to exchange views with Stone and other foreign national accountants.

During the war period (May 1940- May 1945), statistical information deteriorated drastically and annual national accounts could not be compiled. These five years were therefore summarized in one set of simplified accounts for the whole war period. After the liberation, the work on national accounting was swiftly resumed, but the effects of the final war years on the statistical organization had been so devastating that it was not until the end of 1948 before a reliable set of national accounts for a post-war year (1946) could be completed.

Detailed figures for 1946 and 1947 and revised accounts for 1938 were published in 1950 (CBS, 1950). This was a landmark publication containing input-output tables, an improved accounting system, detailed tables on revenue and expenditure of the government and a description of concepts, estimation methods and uses of national accounts statistics. In order to inform the international statistical community, the publication was translated in English and extended with descriptions of the work done

on quarterly accounts and national wealth (CBS, 1952). These publications bear the stamp of Oomens, the head of the national accounts division.

The major advancement was the introduction of input-output tables. The accounting system was not only presented as a set of T-accounts, but also as a matrix showing an input-output table extended with national accounts transactions like interest, profit, direct taxes and insurance premiums and benefits. For all thirty industries, separate operating accounts were presented showing production and value added. Furthermore, for about five hundred branches production, sales and destination (rest of the world, consumers, other) were shown.

The quarterly accounts started in 1950. Its format and estimation methods resembled that of the annual national accounts and input-output tables. This completed the development of the typical Dutch input-output approach to national accounting: input-output tables are compiled annually and are used as the basis for compiling annual sector accounts and quarterly accounts.

Statistics Netherlands on the uses of the national accounts in the fifties

Also the use of national accounts was discussed in the landmark publication of 1950. Two types of uses of national accounts were distinguished: statistical and non-statistical. The major statistical use was to provide a systematic framework that can be used to judge the consistency, comprehensiveness and co-ordination of the economic statistics. In this way, the chaotic set of individual statistics can be transformed into a system of economic statistics efficiently serving the data needs of the national accounts. A second statistical use was to provide the weights for the calculation of index numbers on volume and price changes.

The non-statistical uses were also briefly discussed. They give an impression of the use of the Dutch national accounts as a tool for analysis and policy around 1950. They cover three basic roles of the national accounts:

- A framework for coordinating economic and financial policy;
- A framework for economic thinking;
- A tool to forecast and investigate the consequences of economic policy.

The national accounts stresses the national economy and the interactions between the various parts. This basic insight stimulates the government to coordinate the policy measures of the various ministries. International cooperation and aid (e.g. the Marshall plan) also demands the simple macro economic overviews provided by the national accounts.

The national accounts can also serve as a framework for economic thinking. Practice shows that studying the basic principles of the national accounts greatly contributes to the economic insight of students. Furthermore, the accurate definitions of macro-economic concepts, like national income, capital formation, final

consumption and saving, may also serve economic theory. They can help avoiding disputes ultimately based on the use of different and inconsistent definitions.

The role of the national accounts as a tool to forecast and investigate the consequences of economic policy is also very important. This is evidenced by the national budget in the form of a set of national accounts estimated by the CPB. Also the input-output tables are an very important tool. For example, they can provide the material for calculations about the influence of changes in import price, wages and indirect taxes on the prices of finished goods and for determination of the import quota of consumption and investment goods. Furthermore, the quarterly accounts are very important to verify as soon as possible the extent to which the planning figures by the CPB have been realized. Discrepancies between the estimates in national budget and the national accounts can be used to detect the role of unforeseen factors and in tracing inaccuracies in calculations or techniques of planning. Finally, national accounts time series can be used for econometric studies on the national economy and their major aggregates.

The first economic growth figures and start of annual regional accounts

In the national accounts 1954 for the first time data on price and volume changes of the major macro-economic aggregates, like economic growth figures, were published.

In 1958 a completely revised set of national accounts was published for the years 1948-1957. The international definitions of the United Nations (SNA53) and OEEC (1952) were now completely implemented. Five yearly regional input-output tables were published between 1960 and 1975. From the national accounts 1977 regional figures derived from the national input-output table were published annually.

Measuring the hidden economy

In the eighties a major issue became the size of the hidden economy. How big was the hidden economy in the Netherlands and to what extent was it included in Dutch Domestic Product? The latter issue was tackled by Broesterhuizen (1983) with a sensitivity analysis. He investigated the reliability of Dutch GDP estimates in view of fraud, i.e. not reporting or underreporting of income to the tax and social security authorities or in statistical surveys. The conclusion was that for GDP-levels a distortion of more than 5% is very unlikely and that for GDP-growth rates a bias of more than 0.5% is very unlikely.

In an other study, it was reported that the hidden economy was about 10 to 15% of Dutch Domestic Product (Begeer and van Tuinen, 1985) and that more than half of it was covered by the national accounts figures. On an incidental basis, Statistics Netherlands has continued to publish estimates of the hidden economy, see. e.g. Smeekens and Verbruggen (1995).

Chain indices and input-output tables in constant prices

Starting from the National Accounts 1984 input-output tables were published annually in current and constant prices. The figures on changes in prices and volumes, like economic growth figures, were based on chain indices. This early use of chain indices is remarkable. They were recommended for the first time in the most recent international guidelines (SNA93 and ESA95) and only since some years they are being introduced in the national accounts of many other developing countries.

Table 5.2 Major events in Dutch national accounting since 1980.

Year	Event
1983-1985	Various studies investigating the size of the hidden economy
1984	Annual input-output tables in current and constant prices, based on chain indices
1985	First financial accounts
1986	SCP: start of reports on the efficiency of the public sector
1990	CPB: for government expenditure hybrid-functional classification (no COFOG), with price-volume split
1991	Hueting (CBS but not national accounts unit): advocating sustainable national income
1992	Institutional sector accounts and supply and use tables; divergence with accounts and tables used by CPB
1993	On request of EU: First inventory on sources and methods for compiling GNP since 1950
1993	First environmental accounts (but without estimates of green/sustainable national income)
1994	First SAM published: not relevant for CPB and SCP
1996	Bruyn-Hundt: the importance of unpaid household services quantified
1998	Government budget: no COFOG anymore, replaced by CPB functions
1999	Implementation of new guidelines (SNA93 and ESA95): substantial change in basic concepts Financial balance sheet, labour accounts and functional classification for government expenditure
2000	Historical national accounts focused on economic growth by industry 1800-1913 (van Zanden)
2001-present	On request of EU: various improvements in measuring price- and volume changes
2003-present	Various studies aimed at measuring intangible capital, e.g. R&D
2007	Multi-factor productivity accounts
2008	On request of EU: first quarterly sector accounts, e.g. now also quarterly disposable income or loans

Towards more institutional and descriptive accounts and tables

A major revision occurred in 1992. Following the international guidelines (SNA68; UN, 1968) the functional sector accounts were replaced by a set of institutional sector accounts. The major difference is that the institutional sector households does not only include the role of households as consumers but also their productive activities, e.g. the self-employed and the services of owner-occupied dwellings. As a consequence, the latter are not recorded anymore as part of the sector non-financial corporations. Also supply and use tables were introduced to replace the industry by industry input-output tables.

Textbox 5.1 Measuring productivity of government services: who does what for what purpose?

Since the fifties, in the Dutch national accounts the volume of government output was by measured by its inputs and by definition no productivity growth occurred. However, in 1990 a comparison by the CPB of economic growth in Germany and the Netherlands revealed that Dutch growth lagged mainly behind due to this assumption of zero-productivity growth. After comparing in a rough way alternative assumptions (see Kazemier, 1991), a new convention was adopted: productivity growth for the government was equal to the (three years moving average of the) incidental wage increase; this yielded a productivity increase of about 0.7% per full-time equivalent worker and raised the annual Dutch growth rate with 0.1%. The last decade, incidental wage increase was much lower, resulting in assumed productivity increases of 0.3%. This productivity-convention in the Dutch national accounts is hardly known, not very transparent and often misunderstood. For example, politicians stated that statistics proved that labour productivity increase of civil servants was low and much lower than in the market sector, suggesting they work less effective or hard! In times of budget cuts it was argued that by cutting about 0.7%/0.3% annually civil servants could continue to do the same tasks, but with less people. And a professor in economics told his students that raising his salary would raise his productivity!

Since the mid-eighties, on request of the government, the Dutch social-cultural planning bureau (SCP) regularly compiles data on productivity growth at the government. These are based on a number of simple output-indicators, like the number of tax declarations, social benefits, legal charges, law suits and prisoners. The SCP estimates suggest big differences in productivity growth within the government. These rough estimates hardly take account of any changes in quality. Nevertheless, the estimates can be informative, because only very big unrecorded quality changes can undo such differences. The SCP does not provide estimates for collective services, like defence and policy preparation.

Productivity growth at the government, 1990-2004

	1990-1994	1995-1999	2000-2004	1990-2004
Tax office	3.9	2.1	1.8	2.7
Social security administration	- 0.7	0.3	0.5	0.0
Safety	- 1.8	0.0	2.8	0.1
Courts	- 2.3	- 5.8	0.9	- 2.7
Prisons	3.1	1.0	5.1	2.9
Police	- 2.8	1.4	3.4	0.4

Source: SCP

According to Baumol's law, productivity growth is more difficult to achieve for labour intensive personal services. The SCP-estimates seem to confirm this. The productivity increase for the policy is substantially lower than the 2% for the market sector. Exceptions during the period 1990-2004 were the tax office and prisons. This may be due to automation and more prisoners in one cell. In comparison with the tax office, productivity growth in social security was low. This confirms the opinion of experts. However, it may also partly be due to problems in covering quality improvement. For example, for social assistance benefits a productivity decline of 15% was measured since 2000. This was probably caused by the very labour intensive efforts by municipalities to reduce fraud. This was a very successful policy, as it resulted in a substantial decline in the number of benefits, while the business cycle was very bad.

The SCP has also conducted data envelopment analyses (DEA), e.g. for hospitals. This is a type of benchmarking showing the differences with the most efficient producers. This type of analysis is not suited for measuring productivity growth over time at an aggregate level, like required for the national accounts.

At the CPB, investigating productivity of various government units (e.g. police and various social security administrations) was also a major issue. However, these studies focused on investigating the effect of incentives (e.g. performance contracts) or changes in inputs (e.g. the number of policemen) on outcomes (e.g. crime rates). In the government budget, performance budgeting has been introduced formally. However, the adverse effects of some of the underlying performance contracts, e.g. for the police, were soon commonly known and confirmed by CPB studies.

However, the CPB, a major user of the sector accounts and input-output-tables, preferred to continue as if no major changes had occurred. For the CPB, the old and much simpler set of tables was more convenient for forecasting and analyzing the Dutch economy; spending lots of time and resources in modifying the models and working habits did not seem to be a wise investment. Therefore, Statistics Netherlands provides the CPB each year also industry by industry input-output tables (calculated on the basis of the new supply and use tables).

Furthermore, for the first time since the fifties also an inventory was made describing the data sources and methods for estimating Dutch GNP (Bos and Gorter, 1993). Since 1989 contributions to the EU are also levied on the basis of the GNP-figures of the Members States. As a consequence, Member States are now required to provide information on the data sources and estimation methods used in calculating GNP.

A Social Accounting Matrix for the Netherlands

A Social Accounting Matrix is a way of presenting a national accounting system (not T-accounts but a matrix). In the seventies, at the ILO it was transformed into a tool for development planning (see Pyatt and Round, 1977). Compiling a SAM was regarded as the best way to obtain a rather complete and consistent set of data for modelling the national economy. In particular for developing countries, the SAM and the corresponding econometric model should include income distribution, poverty and demographic changes. In 1994, under the supervision of the author of the SAM-chapter in the SNA93 (Keuning), the SAM was introduced for the first time in the national accounting practice of a developed country, i.e. the Netherlands¹⁸. A distinctive feature of this SAM is the absence of a direct link to modelling for policy purposes. A major reason is that Dutch model-builders do not meet the data problems common in developing countries: they can make use of a wide range of readily available national accounts statistics and of various sets of micro-economic data (tax records, survey results). As a consequence, they do not need an intermediate data set and can analyse income distribution much better and in much more detail (e.g. reflecting the specific features of the Dutch tax and social security system).

Major change in basic concepts due to implementation of new guidelines

In the revision of 1999 the concepts of the new international guidelines (SNA93 and ESA95) were introduced (see Bos, 1994b and Buiten et al., 1994). This implied a

¹⁸ It was not the first time that a SAM was compiled for the Netherlands. Already in 1982, inspired by Pyatt and Thorbecke, an incidental estimate of a SAM for the Netherlands was made by the scientific council for government policy (von Eije, 1982).

substantial change in basic concepts. For example, the introduction of capital consumption on infrastructure increased government final consumption

Textbox 5.2 The CPB-functional classification: why no COFOG and why a price and volume split?

In Statistics Netherlands, the international functional classification for government expenditure (COFOG) was used for the central government and local government. Since the sixties, it was also used in the budget for providing supplementary overviews, i.e. not expenditure by Ministry but for long time series expenditure by the central government by COFOG-function were preferred. However, in the Dutch national accounts, an overview of total government expenditure by function was absent until 1999.

In the begin nineties, the CPB wanted to analyze Dutch public expenditure in historical and international perspective (Jansen and Vossers, 1990). However, data by COFOG-classification were not sufficiently available for this purpose. Furthermore, the COFOG-classification was not very well suited for analyzing and explaining government expenditure in a simple and concise way. And this is still the case. The reason is that some COFOG-functions are too heterogeneous (e.g. general public services includes also development aid, expenditure on research and interest payments), a major policy issue is not at all addressed (infrastructure) and that the number of functions distinguished at the most aggregate level is already very high (10) for a simple overview.

The solution was to derive a hybrid functional table by also using national accounts information by transaction (see annex for the table currently used by the CPB and Bos, 2003b, for a detailed explanation). Interest payments are shown as a separate 'function'. The function Infrastructure is equal to the government's capital formation on infrastructure. The function Transfers to corporations is equal to all income and capital transfers to corporations. The function International cooperation is equal to all income and capital transfers with the Rest of the world. Health care is equal to all income transfers in cash and in kind for health care purposes. The function Social security is equal to all income and capital transfers in cash and in kind to households with the exception of those for health care purposes or education. The expenditure on the other transactions, e.g. compensation of employees, intermediate consumption and capital formation not on infrastructure, are split over the functions public administration, public order and safety, defense and education; the function public administration serves as a residual function, i.e. all that is not allocated to any other function is classified as public administration.

The CPB decided also to show the breakdown of government expenditure by function into price and volume changes. For the various (underlying) transactions, prices and volumes can be readily defined. For example, the volume for compensation of employees is the number of full-time equivalents and the price change can be derived as the residual change in compensation of employees. The volume for social benefits is the number of social benefits (weighted by scheme). The price for interest payments is the interest rate. For some transactions, e.g. subsidies or transfers to the rest of the world, meaningful and simple price and volume measures cannot easily be obtained. However, this can be resolved by using the price change of GDP and deriving the volume change as a residual.

The CPB standard table starts with the level of government expenditure as a percentage of GDP and then decompose its change over time into volume and price changes in comparison with those of GDP. Such an overview is very useful for monitoring, analyzing and explaining the major developments in government expenditure and their link to macro-economic developments (e.g. wage rate increases, changes in interest rate and changes in the number of social benefits due to general changes in the labour market). This approach was also for a detailed decomposition analysis of the development of Dutch public expenditure since world war II (see Bos, 2006). Furthermore, since the budget in 1998, COFOG information has disappeared and is replaced by a table showing for the various CPB-functions average growth rates in real terms (i.e. values deflated by the price change in GDP) for the successive periods of government.

expenditure, Domestic Product and national income with 1.4% GDP. Recording expenditure on software and data bases as capital formation increased capital formation, capital consumption, Domestic Product and National Income with 0.8% GDP. Reinvested earnings on direct foreign investment are now included in the primary income flows with the rest of the world. As a consequence, Dutch national income increased with 1.3% GDP. A major shift occurred between final consumption expenditure by households and by the government. The latter included now also 8% GDP of social benefits in kind via market producers, like health care services financed by social security, rent allowances and free transport for students. Social security contributions were reduced with 1.2% GDP by excluding branch-specific social insurance, e.g. for civil servants.

European requirements on the harmonization of GNP-estimates also induced some substantial changes. The payments to people in social workplaces should be recorded as compensation of employees instead of social benefits. As a consequence, final consumption expenditure by the government, Domestic Product and national income increased with 0.6% GDP. The estimates for the imputed services of owner-occupied dwellings were also revised. This implied a reduction of final consumption expenditure by households, domestic product and national income of 1.3% GDP.

The scope of the Dutch national accounts was extended in three respects. Firstly, financial balance sheets were introduced. Secondly, labour accounts, including a lot of information on the number of jobs and the hours worked by industry, were incorporated. Thirdly, following EU-data requirements, government expenditure have been classified by COFOG-function.

Productivity and the Dutch national accounts

Dutch national accounts statistics have always been used for calculating productivity, e.g. labour productivity was calculated by data users like the CPB as the volume growth of GDP divided by the change in employment. However, for decades, Dutch national accountants felt insecure about using the national accounts for deriving productivity figures; as a consequence, such figures were not published by Statistics Netherlands. Some years ago, this situation has changed drastically. In 2007, for the first time Dutch growth accounts were published, which measure and analyse total factor productivity development for a wide range of industries. The data set used is in most respects the same as that for EU-KLEMS, but there are some differences in data and calculation methods; this partly reflects that EU-KLEMS also want to achieve internationally comparable figures. On behalf of the Netherlands, Statistics Netherlands and the CPB participate in EU-KLEMS.

A specific issue is the measurement of the productivity of government services. This is discussed in textbox 5.1.

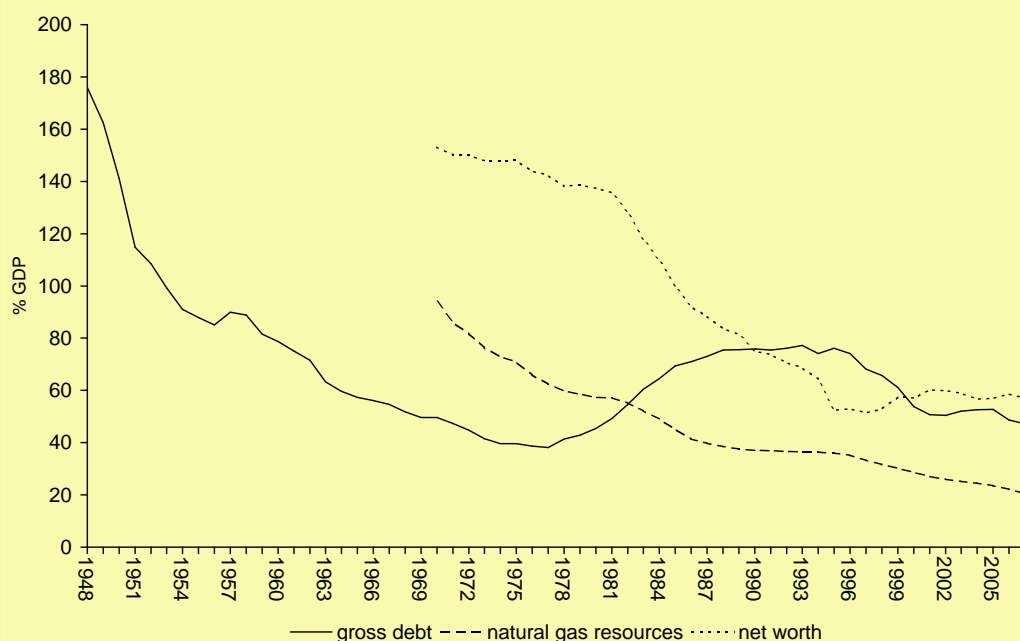
Textbox 5.3 Gross government debt and generational accounts do not suffice: net worth is also needed!

Statistics Netherlands regularly publishes gross government debt; also financial balance sheets for the government are published. However, no complete balance sheet for the government is published. In the budget, a balance sheet for the central government is published. However, this does not cover other parts of the government and the net present value estimates of the natural gas resources did not cover future revenues via corporation tax. The CPB confined itself to a forward looking analysis of the sustainability of Dutch public finance.

Two years ago, the CPB estimated a complete balance sheet for the government since 1948. In comparison to the gross debt figures, this gave a rather different picture^{a)} (see below). It was also very useful for bridging the gap with the calculations on the sustainability of Dutch public finance. For all kinds of data users including major politicians, it was a puzzle how the gross debt ratio could fall rapidly, while the sustainability of Dutch public finance did not improve. This puzzle was now solved and could be explained in relatively simple terms.

Gross government debt in the Netherlands declined from 176% GDP in 1948 to 38% GDP in 1977. During the eighties gross government debt increased to over 70% of GDP and started then to decline; at present, gross government debt is below 50% GDP. This is substantially below the debt-criterion of the European Monetary Union.

Gross government debt, natural gas stock and net worth of the government in the Netherlands, 1948-2007



The government's major assets are the natural gas stock, the fixed capital stock and the financial assets. In the period 1978-1993 the size of government debt doubled by an increase of 38% GDP. Government's net worth decreased much stronger, due to a decrease in the gas stock (-26% GDP) and the financial assets (-9% GDP in the period 1990-1993). Since 1994 Dutch gross government debt decreased with 27% GDP. This substantial decrease in debt is more than compensated by a decrease in the natural gas stock and other property: net worth decreased 14% GDP.

Analyses of the sustainability of government finance are based on discounting future expenditure and revenue and taking account of present net worth. Following these analyses, sustainability is achieved by anticipating the forthcoming costs of ageing by an increase in net worth. In particular due to the exhaustion of Dutch natural gas reserves, this is not the same as reducing government debt.

a) This was already noted at the start of the EMU, see e.g. van Hoek and Zalm (1992).

On request of EU: quarterly sector accounts

In 2000, the EU-Member States decided to develop –in addition to the already existing quarterly accounts focused on the supply and use of products- quarterly accounts for revenue, expenditure and financial transactions of the sector general government and other sectors. Timely information by independent statistical offices on e.g. net lending by the government, disposable income of households, mortgages of households and loans by non-financial corporations was regarded to be essential for European monetary policy. The first complete set of quarterly accounts was published by Statistics Netherlands in 2008¹⁹.

From the point of view of national data users, like the Ministry of Finance and the CPB, the value added of these quarterly sector accounts is not very big. Quarterly accounts on the supply and use of goods and services already exists. For information about the public finance, no new information becomes available; in its forecasts the CPB is already exploiting all available information (e.g. monthly data on tax revenues, data from the budget office on central government expenditure, data by the social security funds).

On request of the Ministry of Finance and the CPB, Statistics Netherlands had also tried to obtain much better and quicker estimates of the government balance of local government.²⁰ Despite new surveys and a lot of joint efforts by Statistics Netherlands and the local government units, some disappointing lessons had to be learned. Firstly, information about three quarters of a year was not very useful, as nearly all major transactions occurred at the end of year. Calculating moving averages of four quarters to detect the development in local government balance has therefore not much value added. Secondly, even after the survey results from four quarters were available, no reliable estimate of the year could be made. It turned out that the bookkeepers and accountants of the local government needed considerable time to consolidate the accounts of the various units involved. This pertained in particular to complicated and substantial transactions (loans, subsidies, purchases and selling of land and buildings) with public (unincorporated) corporations, like the Rotterdam Harbour.

As a consequence, the value added of the new quarterly sector accounts seems to be limited to possibly better and more timely information on disposable income of households or the financial transactions of households and corporations. Simultaneously, the opportunity costs of this European data requirement have been high: it has taken enormous amounts of resources, which have not been spend on vital other

¹⁹ Thusfar only some other European countries were capable of publishing such data.

²⁰ This was a major issue in 2003: fully unexpectedly the local government turned out to have substantial deficits; this was a major reason why the Netherlands surpassed the 3% government deficit-limit of the European Monetary Union.

data demand, e.g. the inaccuracy of the provisional national accounts²¹, measuring services industries or better measuring price and volume changes.

This overview over changes in the Dutch national accounts illustrates that, in particular since 1989, European data needs and many new requirements have revolutionized national accounting in Europe. This applies not only to the national accounts that were then outdated (e.g. based on the guidelines of the fifties), unreliable (e.g. based on one approach for estimating national income without sufficient underlying economic data), not very timely (e.g. in some countries quarterly accounts were entirely absent) and very limited in scope and detail. It applies also to the Dutch national accounts which was then one of the most advanced, reliable and elaborate in the world.

Welfare and the Dutch national accounts

Since the late sixties, official national income statistics have been frequently criticised for not measuring welfare. In the Netherlands, seminal work has been done in demonstrating such limitations of national income.

Hueting (1980) stressed the economic importance of pollution and depletion of natural resources. Hueting (1991) developed a concept of Sustainable National Income (SNI): the maximum income that can be sustained without technological development and excluding the use of non-renewable resources. According to Verbruggen et al. (2000), Dutch Sustainable National Income was in 1990 56% below the official Dutch national income. The purpose of the SNI is not to provide the policy-makers with a goal for national income as such, but to indicate the sustainability gap based on current technology.

Bruyn-Hundt (1995) focuses on demonstrating the economic importance of unpaid household services. On the basis of time use surveys, she estimated the value of unpaid household services in the Netherlands for 1975, 1980, 1985 and 1990. She employed three different valuation principles: minimum wages, wages of home help and average earned wages. The estimates varied from 67% of GNP in 1975 to 108% of GNP. According to all three valuation principles, the value of unpaid household services had declined substantially in 1990: the estimates ranged now from 51% of GNP to 91% of GNP. This decline reflects the increased participation of women in paid work. The estimates for the Netherlands are higher than for other countries, as labour market participation of women in the Netherlands was then still relatively low.

²¹ For a long time, following provisional national accounts statistics, Dutch politicians and economist thought that negative growth had occurred in 2003. However, when the definitive statistics were published this turned out to be wrong!

Text box 5.4 Applications developed by CPB and SCP

The national accounts should be regarded as a joint product with its applications and uses. New or better applications increase the value added of the national accounts, like better software increases the value of a computer. They can also show which parts of the national accounts are most useful.

Over the years, various applications have been developed in the Netherlands. In addition to econometric modelling, examples from the CPB are the hybrid-functional classification of government expenditure (see text box 5.2), the import adjusted method for the decomposition of economic growth, the 'pie' calculation ('who gets which part of the economic growth pie?') and the concept of micro-tax burden. Examples from the SCP are productivity figures on government services (see text box 5.1) and the calculations of who benefits from government expenditure.

In a traditional method for decomposing GDP growth, total imports are deducted from exports. This approach underestimates the importance of exports and overestimates the importance of domestic expenditure categories, like final consumption expenditure by households and the government and capital formation. By using the Cumulated-Costs-Shares from the input-output tables, imports can be allocated to all expenditure categories. Figures for six individual European countries and the euro area show that this tells a rather different economic story (see Verbruggen and Kranendonk, 2008). On the request of the OECD, the CPB will apply this much more sophisticated method for all OECD-countries.

A common question about economic growth is who actually benefits. The answer to this question is not provided by the standard national accounting framework. Therefore, for already more than a decade, the CPB calculates annually which sector reaps the benefits from economic growth (Kranendonk, 1995). This amounts to allocating the increase in net national income to the sectors households, corporations and government using some assumptions. For this purpose, household income is defined as the sum of compensation of employees, property income from pension funds and social benefits in cash and kind including all individual government consumption. Corporate income is defined as the operating surplus resulting after payment of corporation tax and before paying out dividends. Government income is defined as revenues from taxes and social security contributions minus the transfers to households and corporations. This income can be used for capital formation and collective consumption and for reducing government debt.

Taxes and social contributions as a percentage of GDP are not a good yardstick for the level and development of tax burden as perceived by households and corporations. For example, without any change in tax rates, this simple macro indicator of tax burden can change, e.g. due to changes in expenditure patterns towards higher taxed products. It is also distorted by shifts between public and private arrangements (e.g. with respect to social security) and by shifts between public expenditure and tax expenditure. For monitoring the tax burden, in the Netherlands therefore the concept of micro-tax burden has been developed. This measures the development of the tax burden as perceived by households and corporations; it only includes the expected changes in tax and social security revenue due to changes in tax policy; shifts between public and private arrangements are ignored.

Since start of the eighties, on request of the Dutch government, the SCP has published several reports on who benefits from the government; the years covered are now 1977, 1983, 1991 and 1999. Central tables show which income deciles profit from the government expenditure on e.g. education, health care, culture, public transport and housing.

The Dutch environmental account (see e.g. De Haan and Keuning, 1996 and De Haan, 2004) and time use account (see e.g. Kazemier and van Exel, 1992 and van Rooijen-Horsten et al., 2004) could be regarded as a response by statistics Netherlands to the welfare-oriented critique. Note however, that in both satellite accounts no alternative national income concepts are measured (e.g. green national income or national income including unpaid household services).

Historical national accounts

Inspired by the work of Kuznets, a national accounts approach has also been applied to Dutch economic history. The national accounts framework is very suitable to check, combine and complete the limited, patchy and heterogeneous historical information, like tax returns, household budget data, import and export figures, occupational censuses and company archives with price lists, wage-rates and company accounts.

In 1990, Dutch economic historians started a major project to reconstruct historical national accounts for the Netherlands. This has resulted in numerous publications and a data base with national accounts figures on the development of the Dutch economy in the period 1500-1913 (see e.g. van Zanden, 1993 and Smits, Horlings and van Zanden, 2000). These Dutch historical accounts include a breakdown of national income by industry (agriculture and various types of manufacturing and services), by type of income (wage income and income from capital) and by type of expenditure (capital formation, government final consumption and private final consumption). In contrast to current official national accounts, national income includes – partly for practical reasons– all production, income and consumption both inside and outside the market sector, e.g. unpaid household services. This work, and similar work in other European countries, has put an end to the simple idea that there was a one-off break in the economic development which separated the traditional and static economy prior to the industrial revolution from the dynamic and modern economy after it.

Annex. The CPB standard table on public expenditure by function

Table in chapter 4 of economic outlook published twice a year, 2007-2009							
	2007	2008	2009	2008	2009	2008	2009
	% GDP			volume change in %		price change in %	
Public administration	10.1	9.9	9.8	½	-½	3	4
Safety	1.8	1.8	1.8	1½	1¼	3¼	4¼
Defence	1.3	1.2	1.2	-3¼	-½	3¼	4¼
Infrastructure	1.7	1.8	1.8	9¼	4½	2	2½
Education	5.1	5.1	5.1	2	1	3¼	4¼
Publicly financed health care	8.8	8.7	8.8	1	2¾	2	3
Act for exceptional care	3.8	3.3	3.3	-11	2	3¼	3¼
Health care act	4.7	5.0	5.1	10	3½	1¼	3
Other	0.4	0.4	0.4	7½	1	2	3
Social security	11.2	11.2	11.1	0	0	4½	3¾
Old age act	4.7	4.7	4.7	1¼	2	2¾	2¾
Unemployment and social assistance	1.7	1.6	1.5	-9½	-2¼	6	4¼
Disability	1.9	1.8	1.7	-3¼	-3¼	5¾	5
Other	2.9	3.1	3.1	4¾	1	6¼	4
Transfers to corporations	1.9	1.9	1.9	1½	1¼	2¼	2¾
International cooperation	2.3	2.5	2.0	10	-16	2¼	2¾
Interest payments	2.2	2.0	1.9	-¾	-1½	-3	¼
Gross public expenditure	46.2	46.0	45.5	1¼	0	2¾	3½
Real gross public expenditure				2	½		
Gross Domestic Product				2¼	1¼	2¼	2¾
				% total employment		volume change in %	
Employment sector general government	15.8	15.6	15.6	¼	0		
Employment industry health care and other social services	12.8	13.1	13.3	¾	2¼		

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